Assignment #3

- reading2.pdf **A Study on the Manipulation of 2D Objects in a Projector/Camera–Based Augmented Reality Environment** by de Voida et al.
- Appeared in CHI 2005

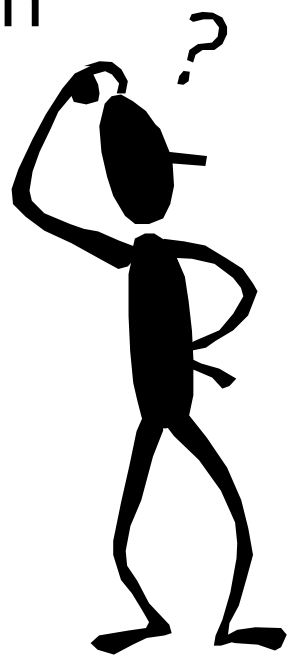
Computer Aspect of HCI

- Go over last year's handout posted on the course web page

Prototyping techniques

Overview

- Prototyping and construction
- Conceptual design
- Physical design
- Tool support



Prototyping and construction

- What is a prototype?
- Why prototype?
- Different kinds of prototyping
  - low fidelity
  - high fidelity
- Compromises in prototyping

- Construction

What is a prototype?

In other design fields a prototype is a small-scale model:

a miniature car
a miniature building or town

What is a prototype?

In interaction design it can be (among other things):

- a series of screen sketches
- a storyboard, i.e. a cartoon-like series of scenes
- a Powerpoint slide show
- a video simulating the use of a system
- a lump of wood (e.g. PalmPilot)
- a cardboard mock-up
- a piece of software with limited functionality written in the target language or in another language

Why prototype?

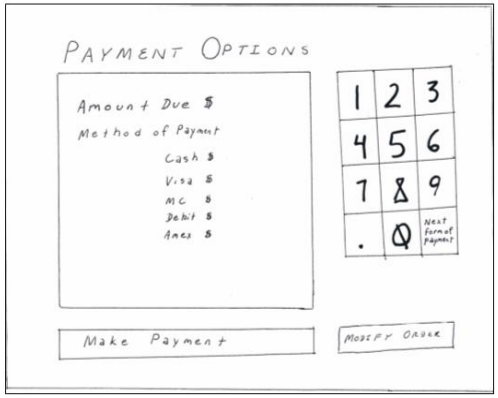
- Evaluation and feedback are central to interaction design
- Users can see, hold, interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- You can test out ideas for yourself
- Prototypes answer questions, and support designers in choosing between alternatives

What to prototype?

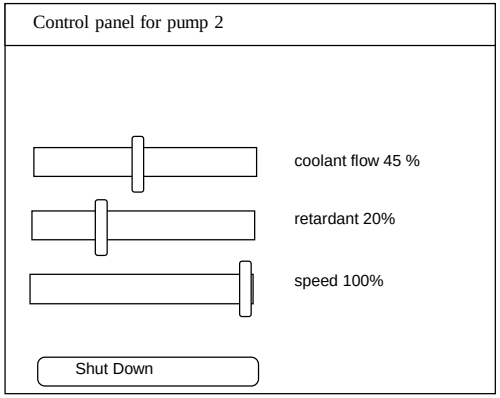
- Technical issues
- Work flow, task design
- Screen layouts and information display
- Difficult, controversial, critical areas

Prototyping Techniques

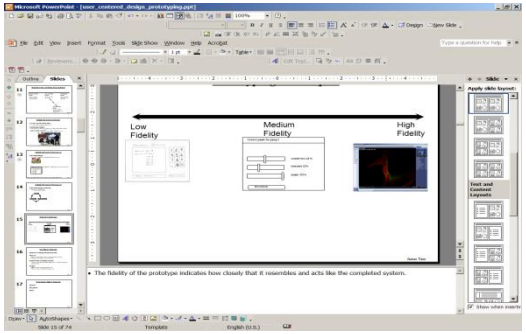
Low Fidelity



Medium Fidelity



High Fidelity



Low Fidelity Prototypes

- Hand drawn mockups of some design ideas
- Focus on:
  - Brainstorming as many ideas as possible (discount usability)
  - Making it clear enough to be understandable
- But don’t focus on making it “pretty”
  - They are not computer generated images (don’t use drawing programs to generate them)
- May be used to elicit feedback from the user

Types Of Low Fidelity Prototypes

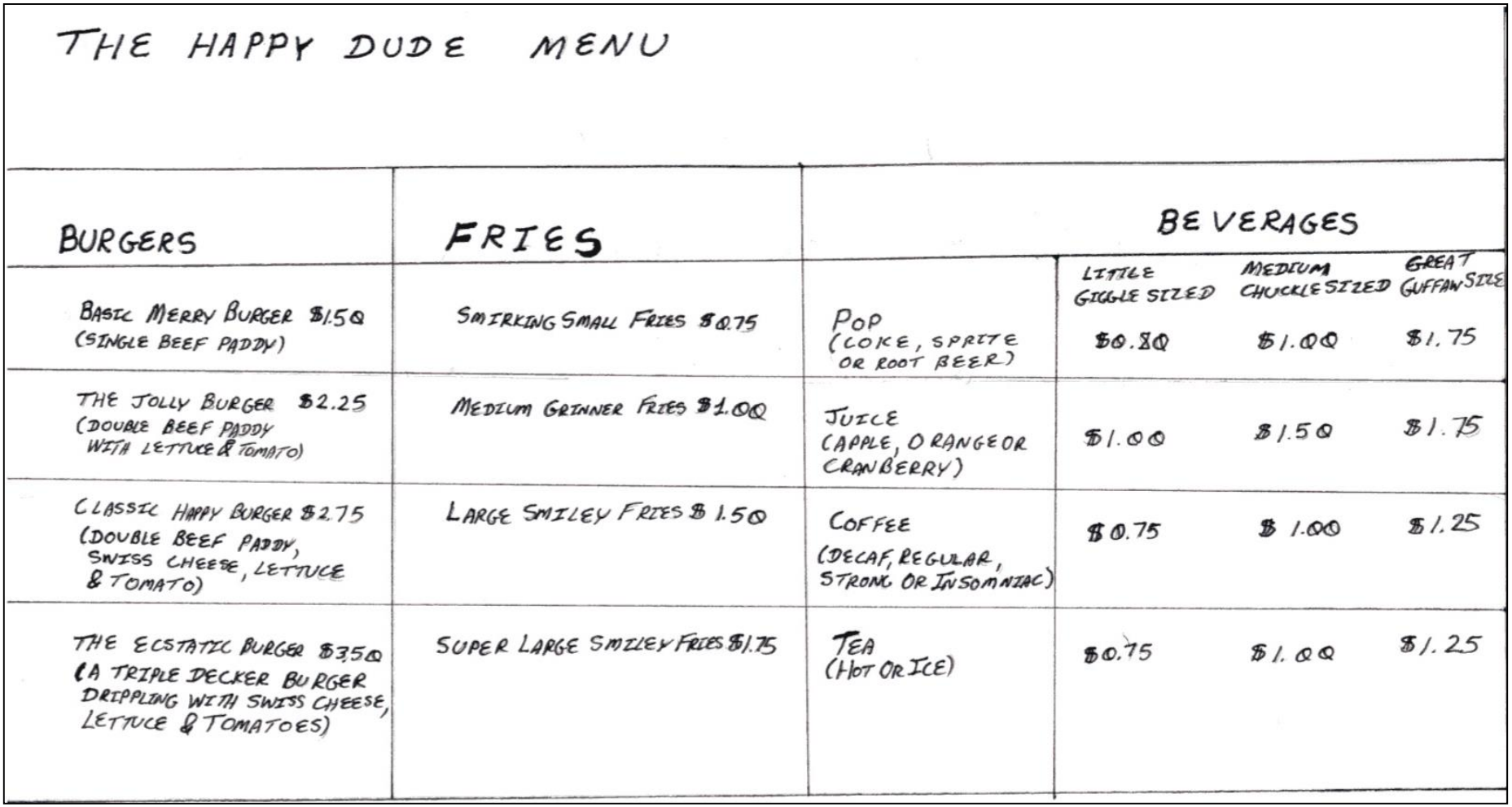
- Sketches
- Storyboards
- Pictive

Low Fidelity Prototypes

- Sketches:
  - A drawing of the high-level appearance of the intended system
  - The crudity of the prototype means people concentrate on high level concepts
  - It may be hard to envision the progression of a dialog
  - Don’t be inhibited about drawing ability. Practice simple symbols

Sketches

Screen 1: Initial order screen

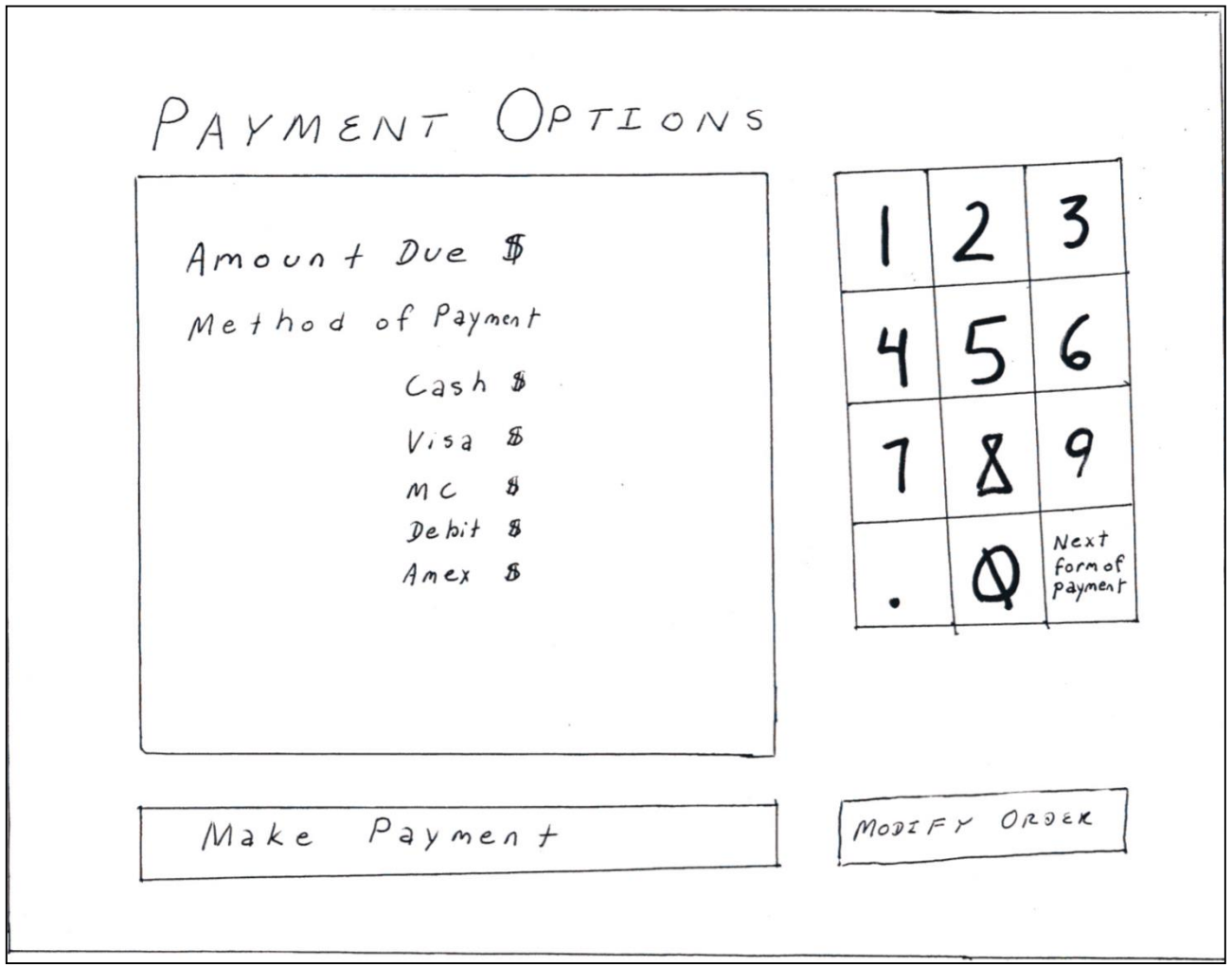


THE HAPPY DUDE MENU

BURGERS	FRIES	BEVERAGES			
			LITTLE GIGGLE SIZED	MEDIUM CHUCKLE SIZED	GREAT GUFFAW SIZE
BASIC MERRY BURGER $1.50 (SINGLE BEEF PADDY)	SMIRKING SMALL FRIES $0.75	POP (COKE, SPRITE OR ROOT BEER)	$0.80	$1.00	$1.75
THE JOLLY BURGER $2.25 (DOUBLE BEEF PADDY WITH LETTUCE & TOMATO)	MEDIUM GRINNER FRIES $1.00	JUICE (APPLE, ORANGE OR CRANBERRY)	$1.00	$1.50	$1.75
CLASSIC HAPPY BURGER $2.75 (DOUBLE BEEF PADDY, SWISS CHEESE, LETTUCE & TOMATO)	LARGE SMILEY FRIES $ 1.50	COFFEE (DECAF, REGULAR, STRONG OR INSOMNIAC)	$0.75	$ 1.00	$1.25
THE ECSTATIC BURGER $3.50 (A TRIPLE DECKER BURGER DRIPPLING WITH SWISS CHEESE, LETTUCE & TOMATOES)	SUPER LARGE SMILEY FRIES $1.75	TEA (HOT OR ICE)	$0.75	$1.00	$1.25

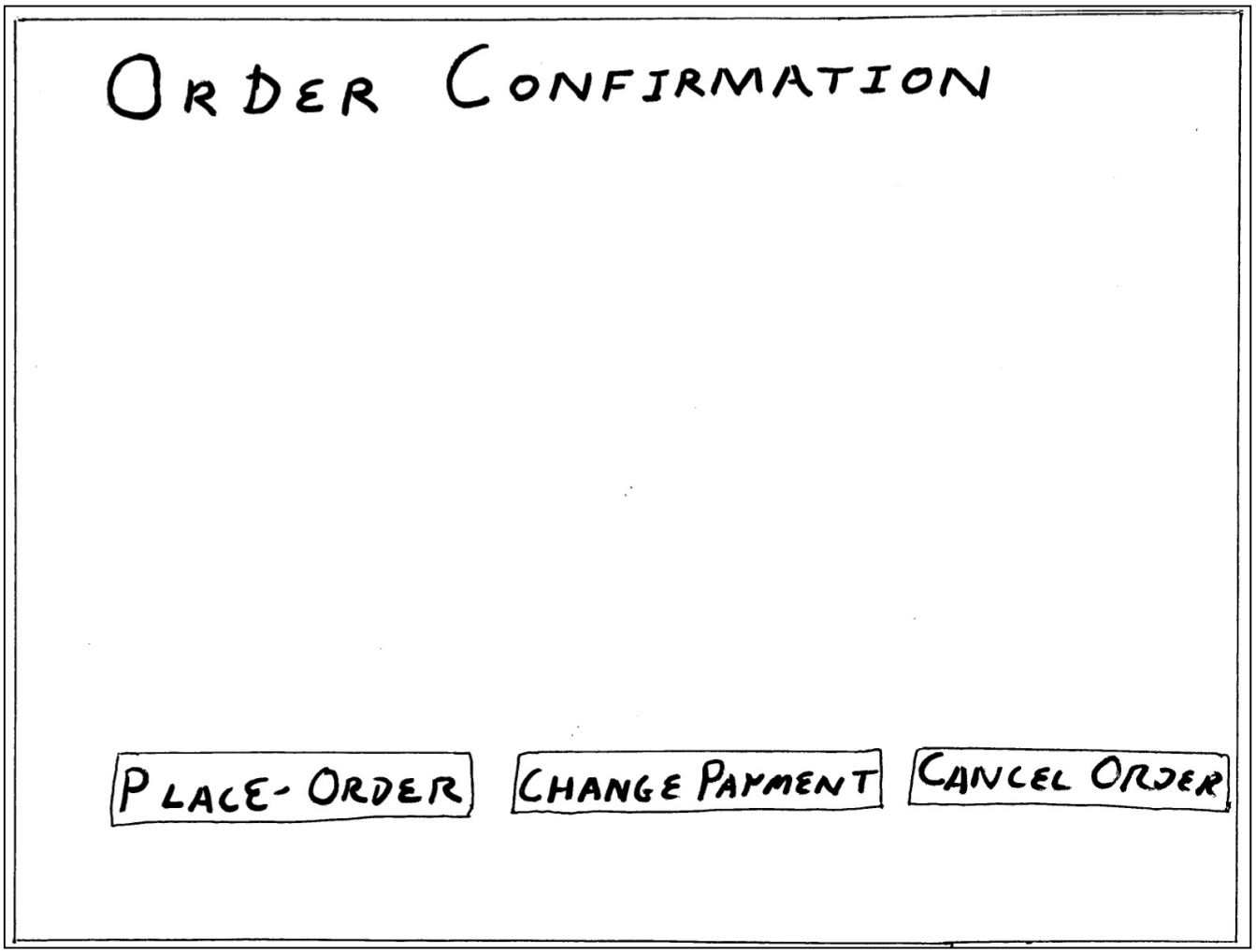
Sketches (2)

Screen 2: Payment screen



Sketches (3)

Screen 3: Order confirmation screen

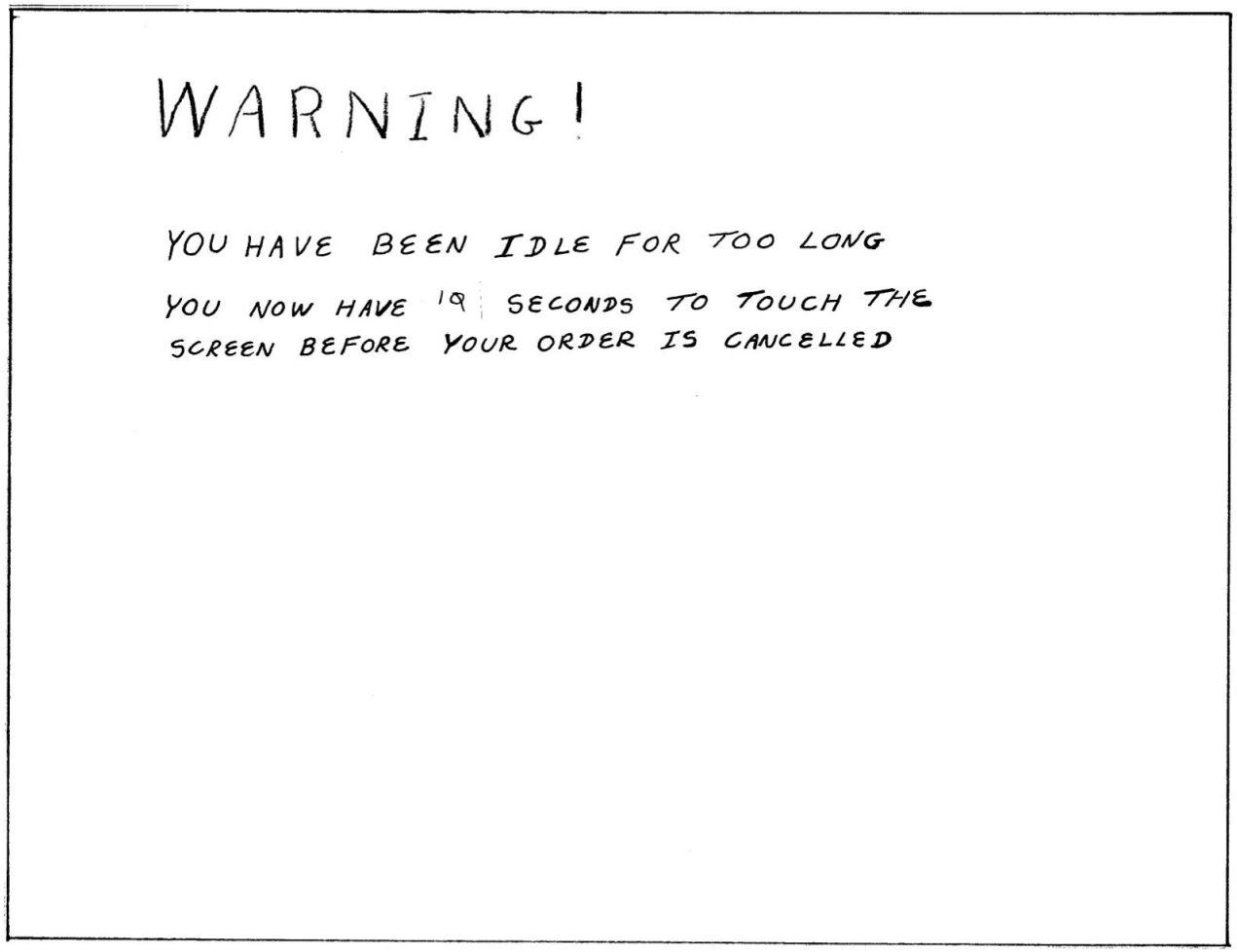


Sketches (4)

Screen 4: Order is confirmed

Sketches (5)

Screen 5: Inactivity screen



Low Fidelity Prototypes

- Storyboarding
  - It's a series of key frames
    - Originally from film; used to get the idea of a scene
    - Snapshots of the interface at particular points in the interaction

- For interfaces it allows users to quickly evaluate the direction of the design

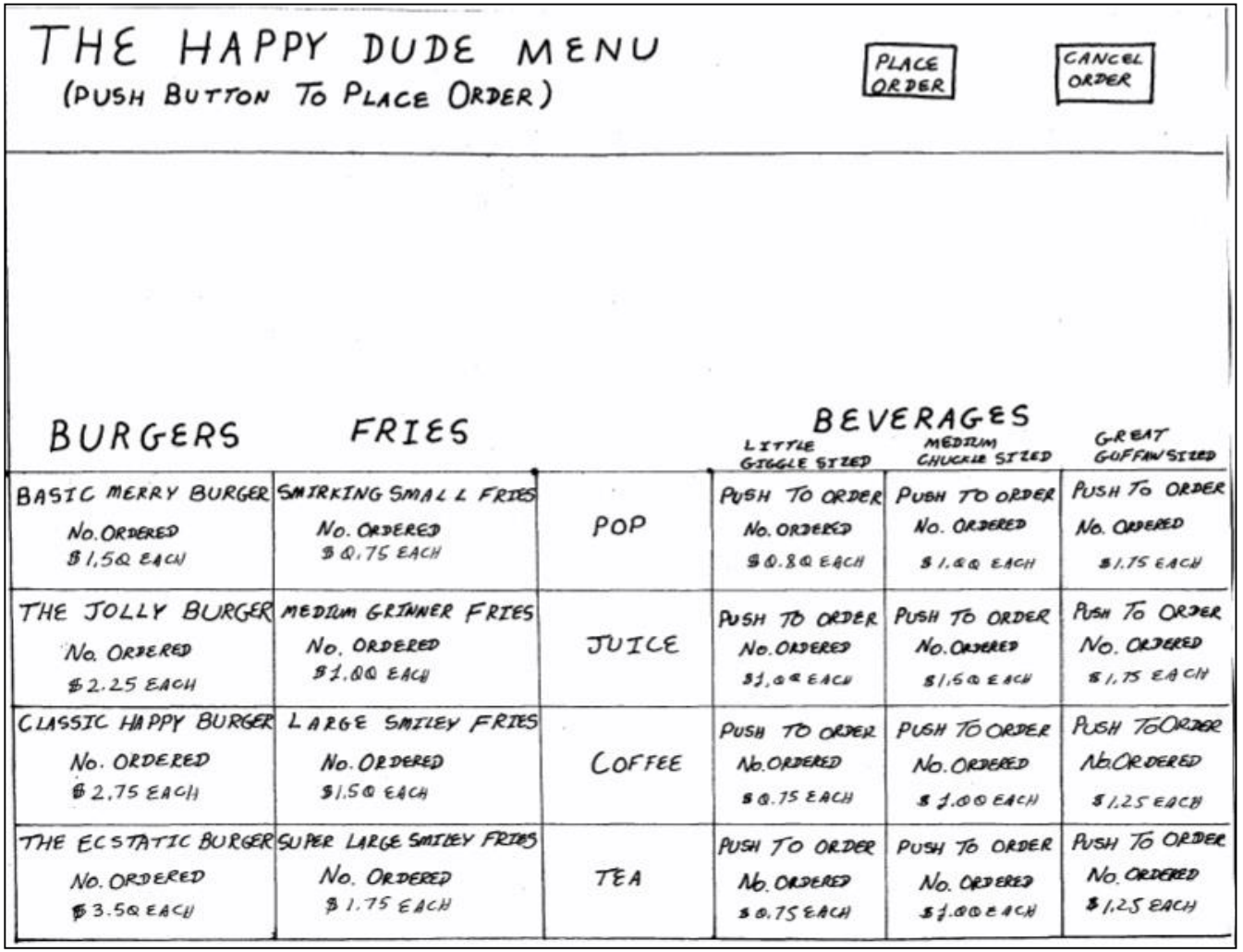
Storyboards

- Often used with scenarios, bringing more detail, and a chance to role play

- It is a series of sketches showing how a user might progress through a task using the device

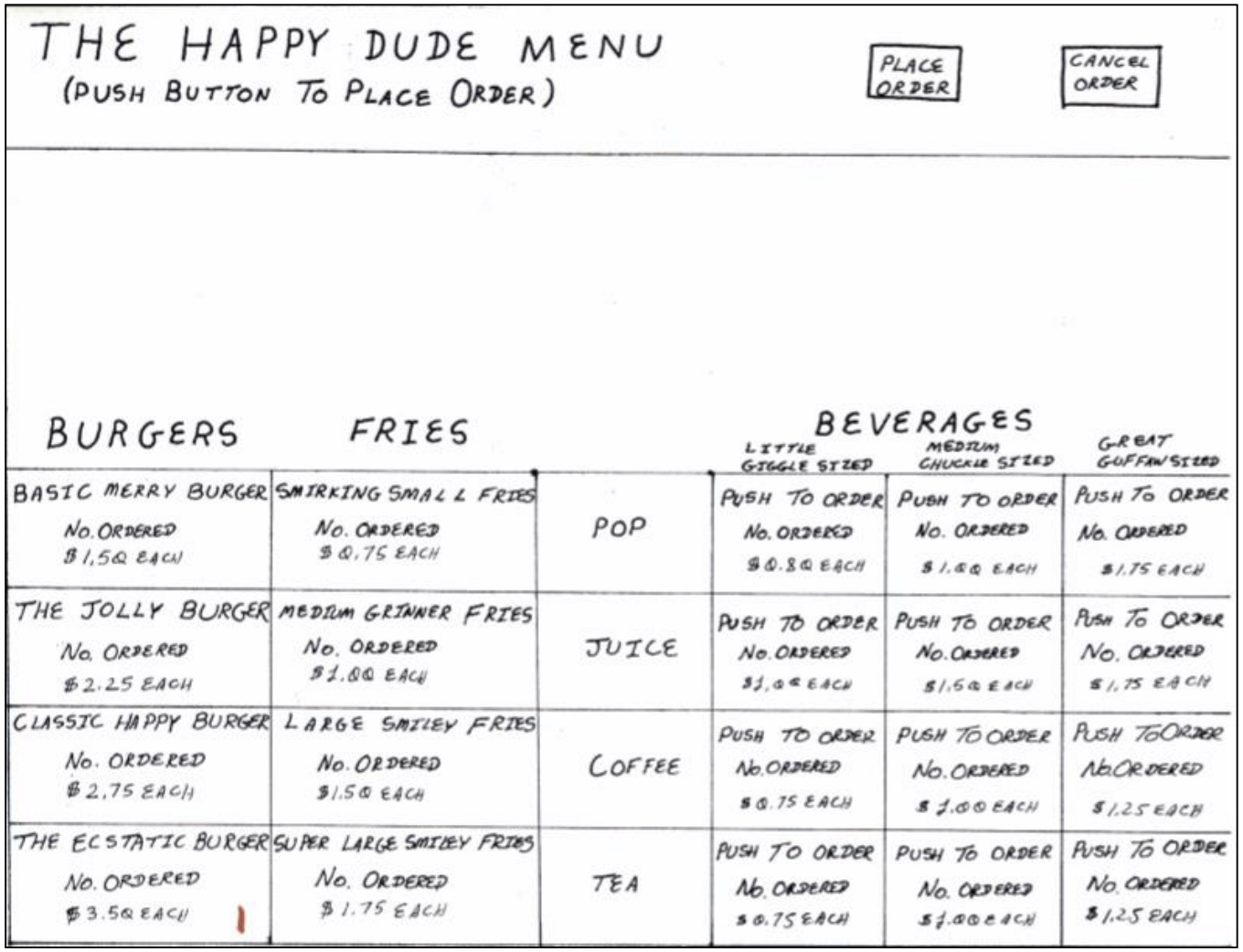
- Used early in design

Storyboarding



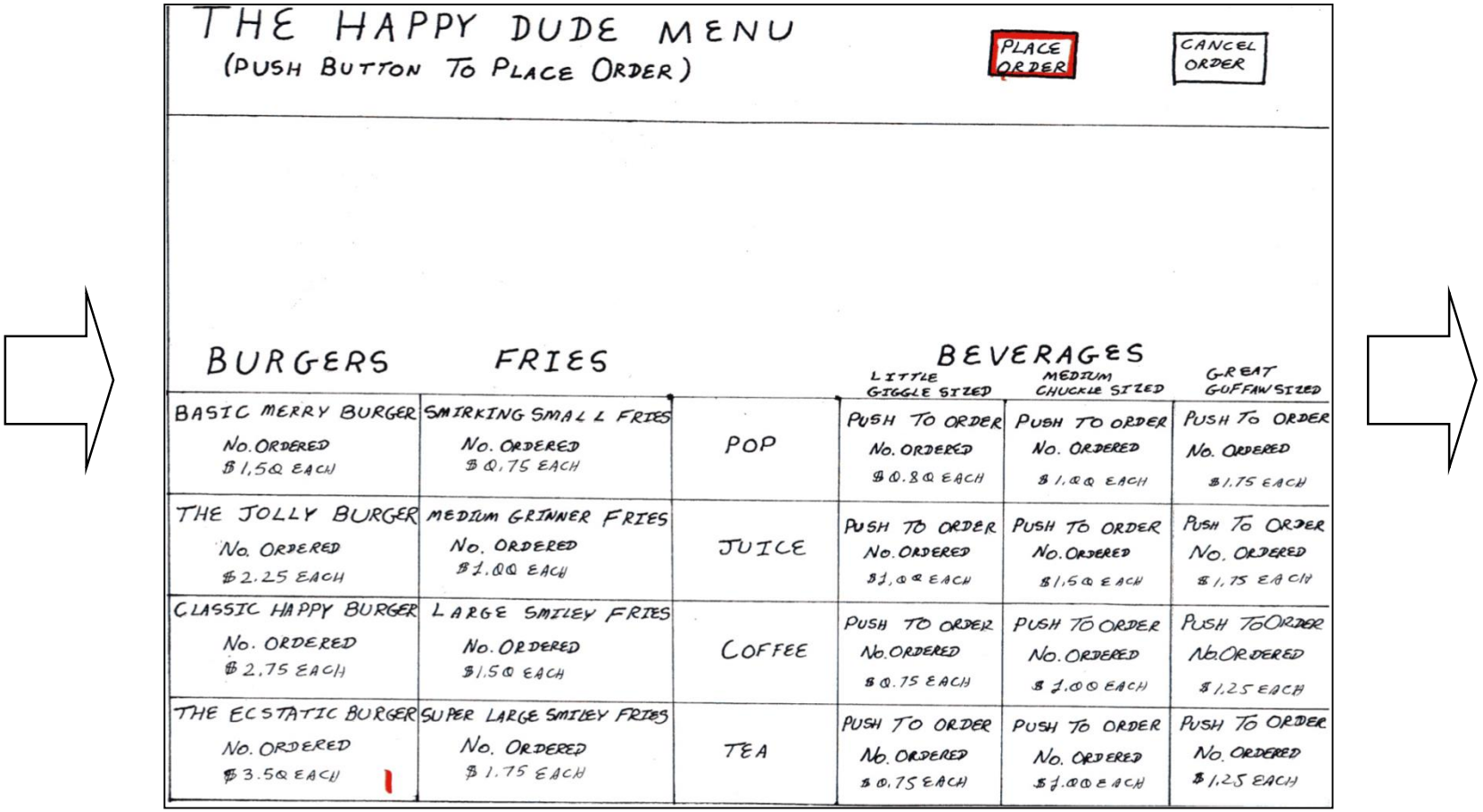
Initial order screen

Storyboarding (2)



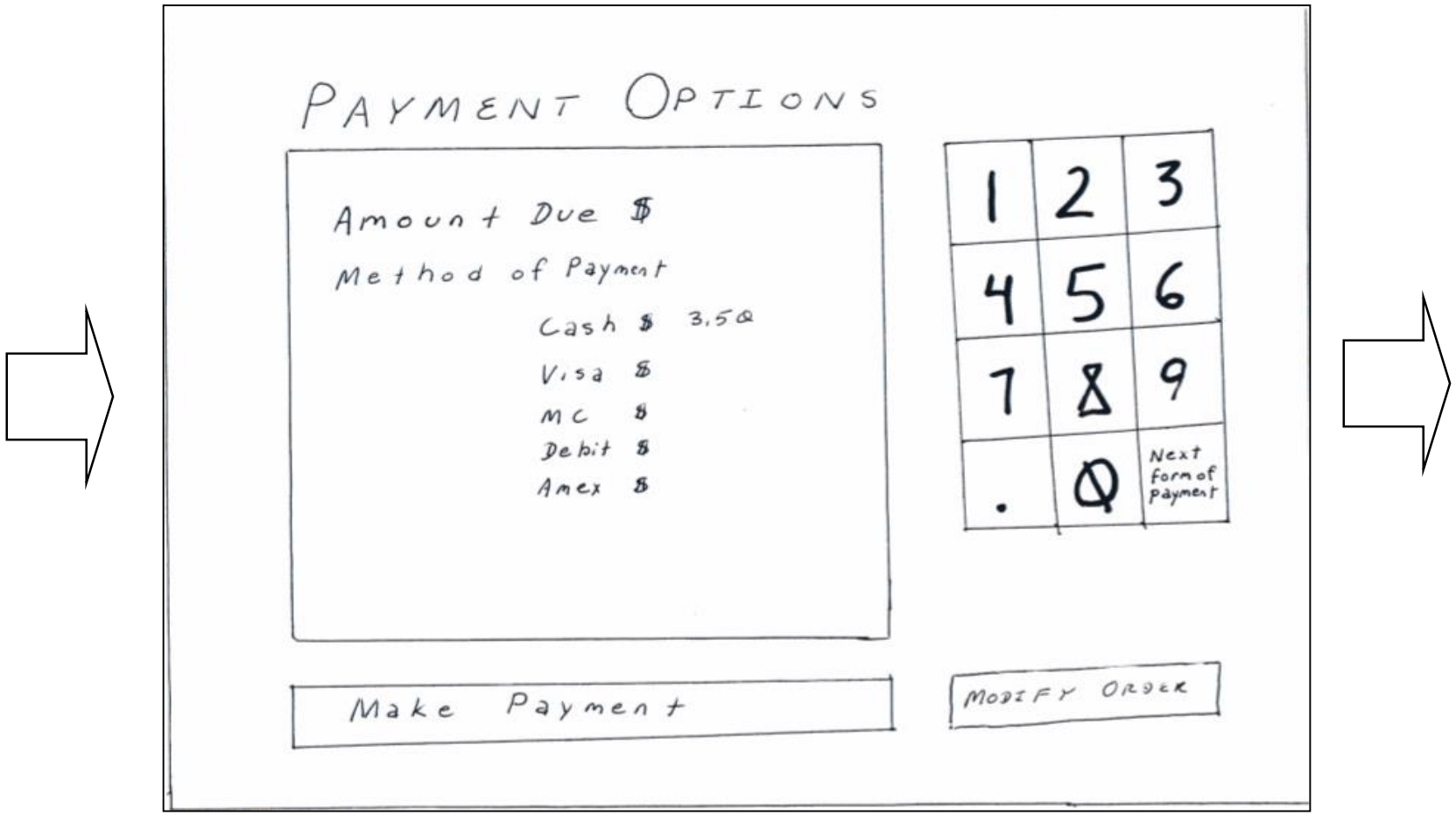
User orders an “Ecstatic Burger”

Storyboarding (3)



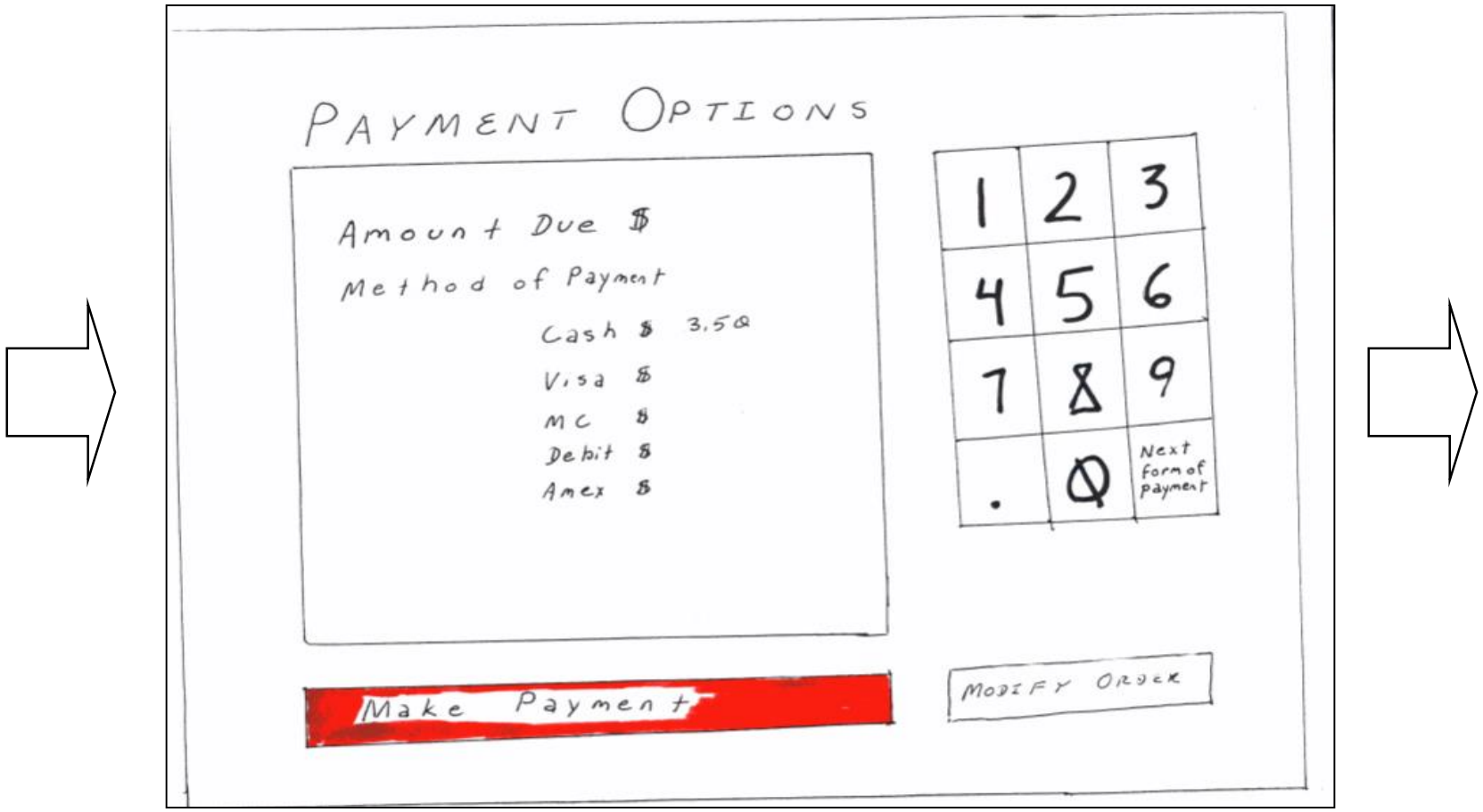
Order is placed

Storyboarding (4)



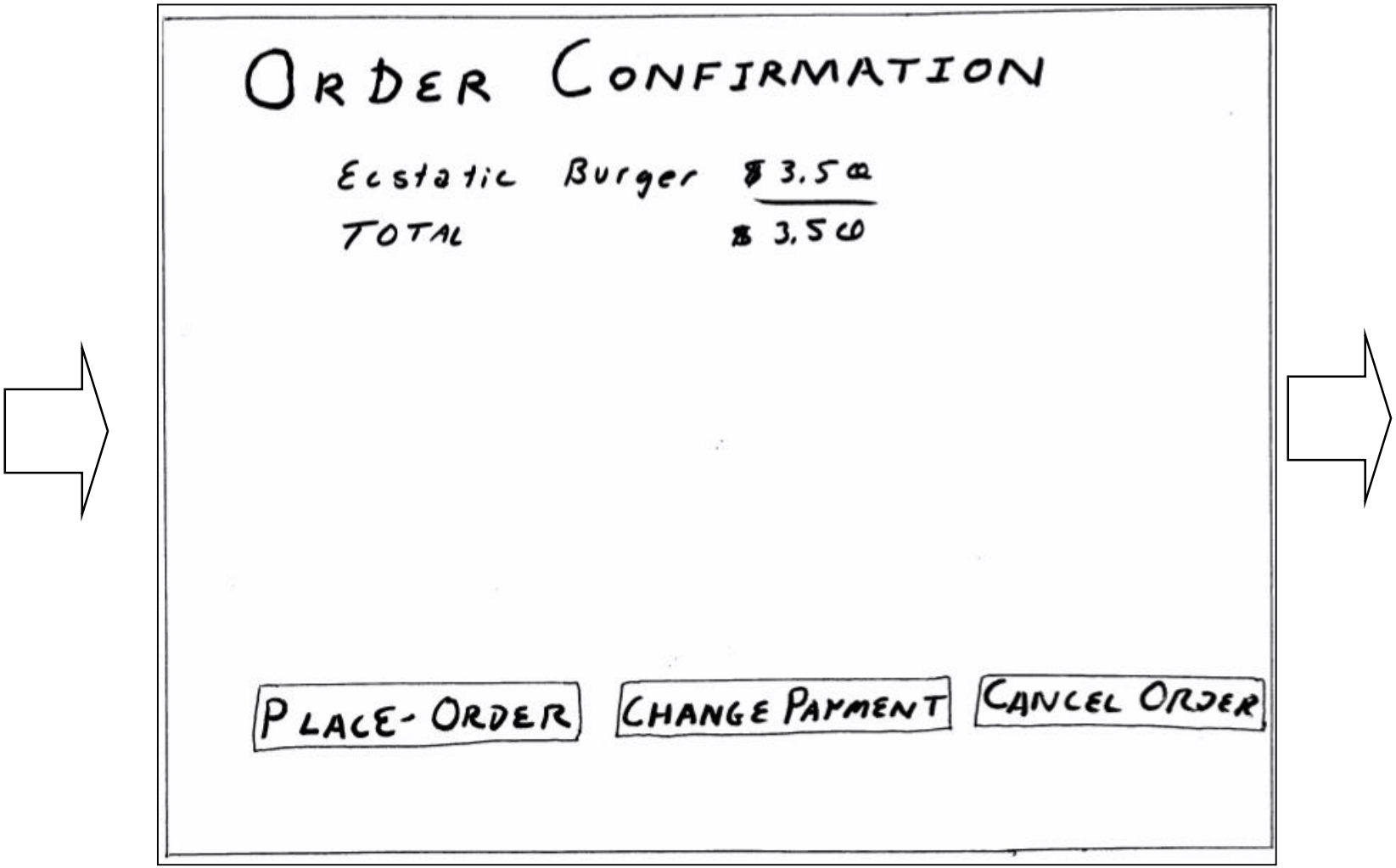
Payment screen comes up

Storyboarding (5)



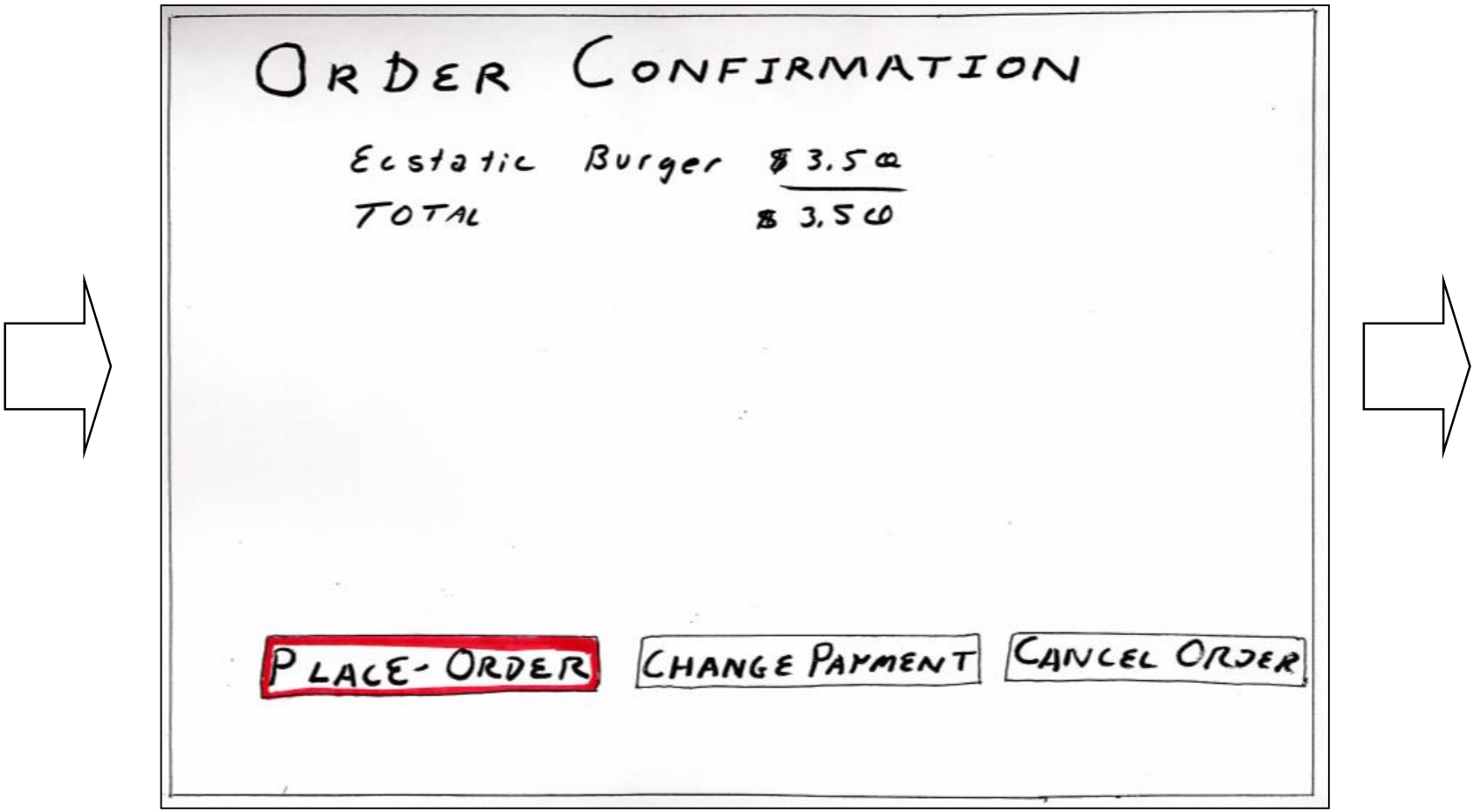
User pays with cash

Storyboarding (6)



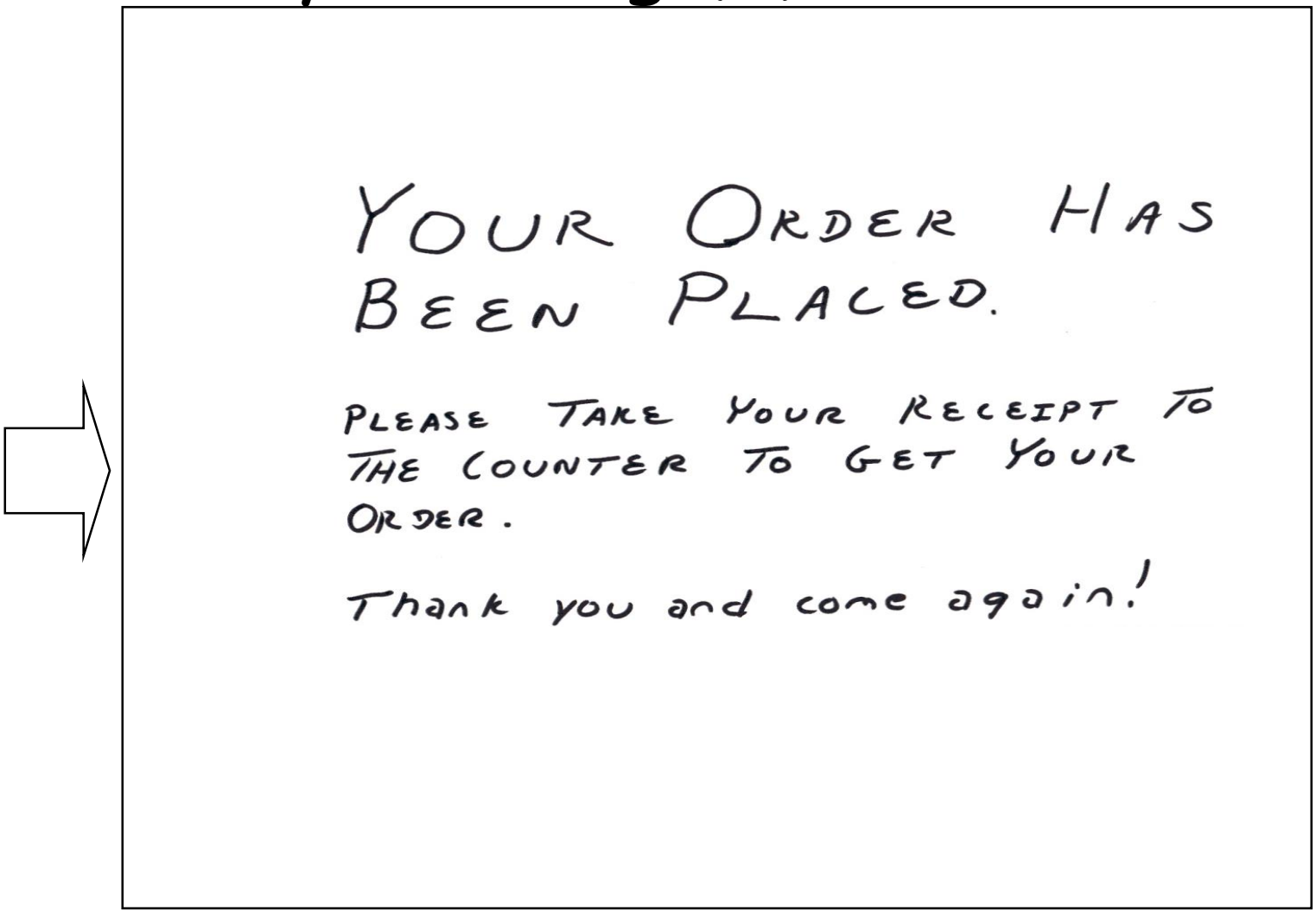
Order confirmation screen comes up

Storyboarding (7)



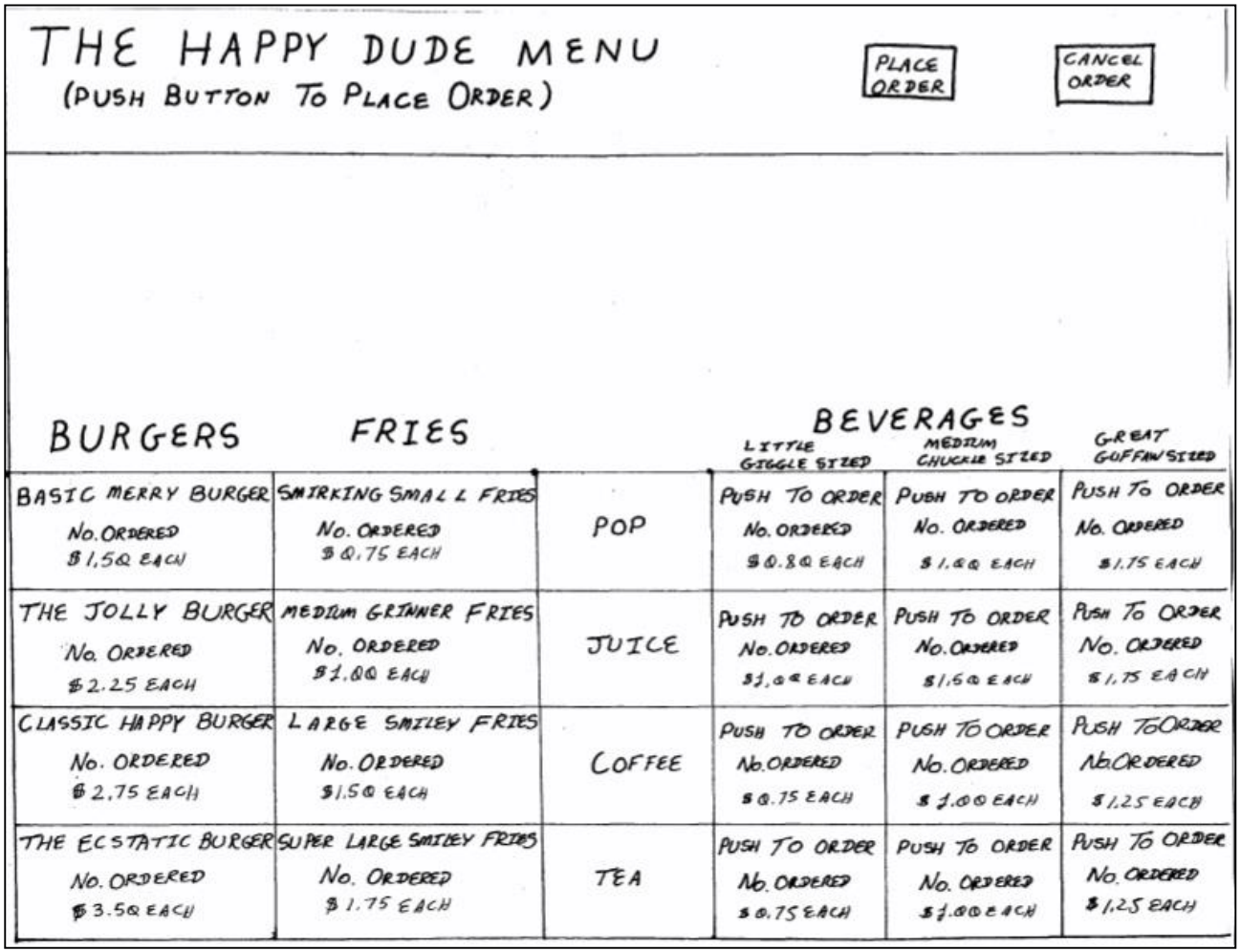
Order is placed

Storyboarding (8)



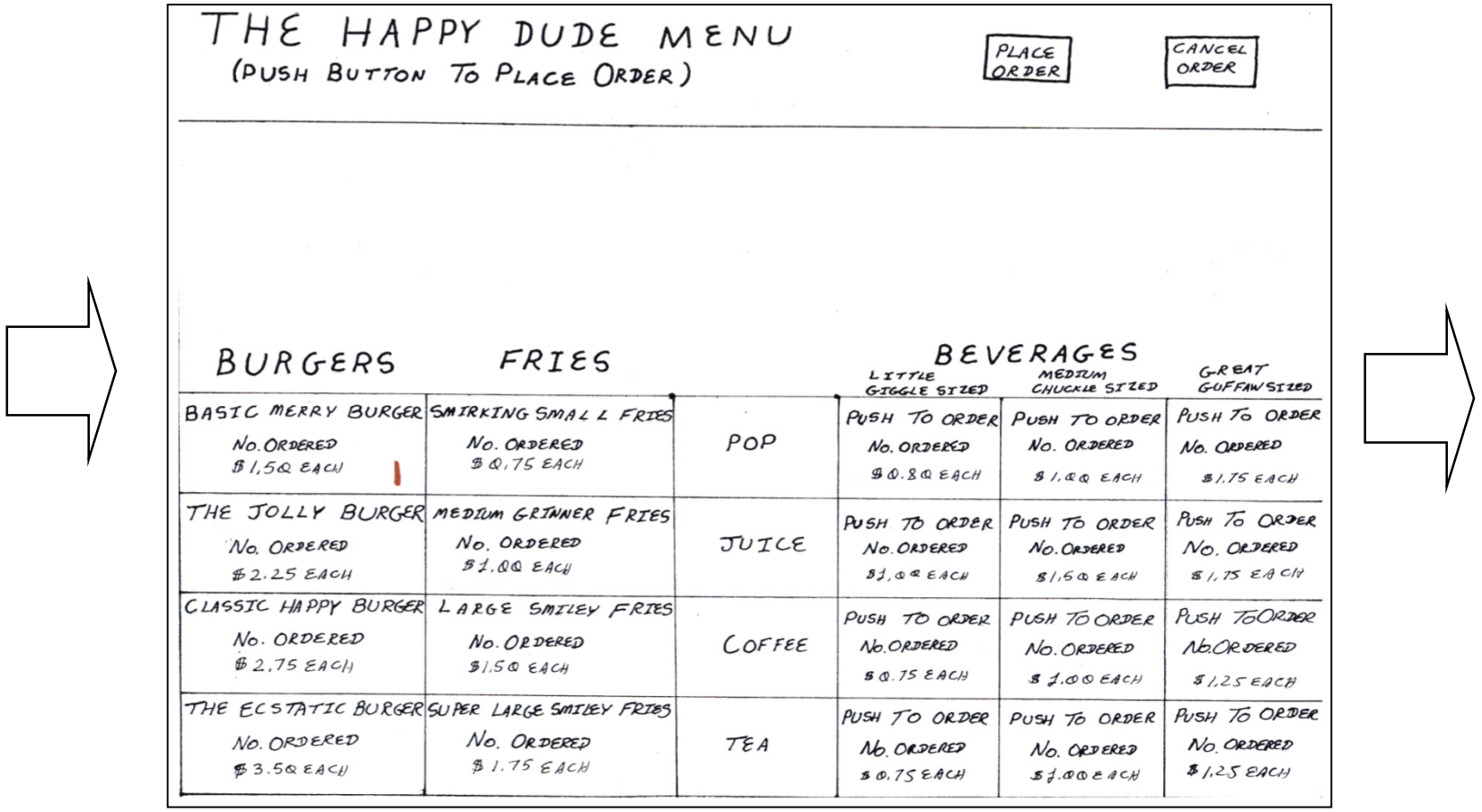
Order confirmation is shown

Storyboarding: Alternate Path



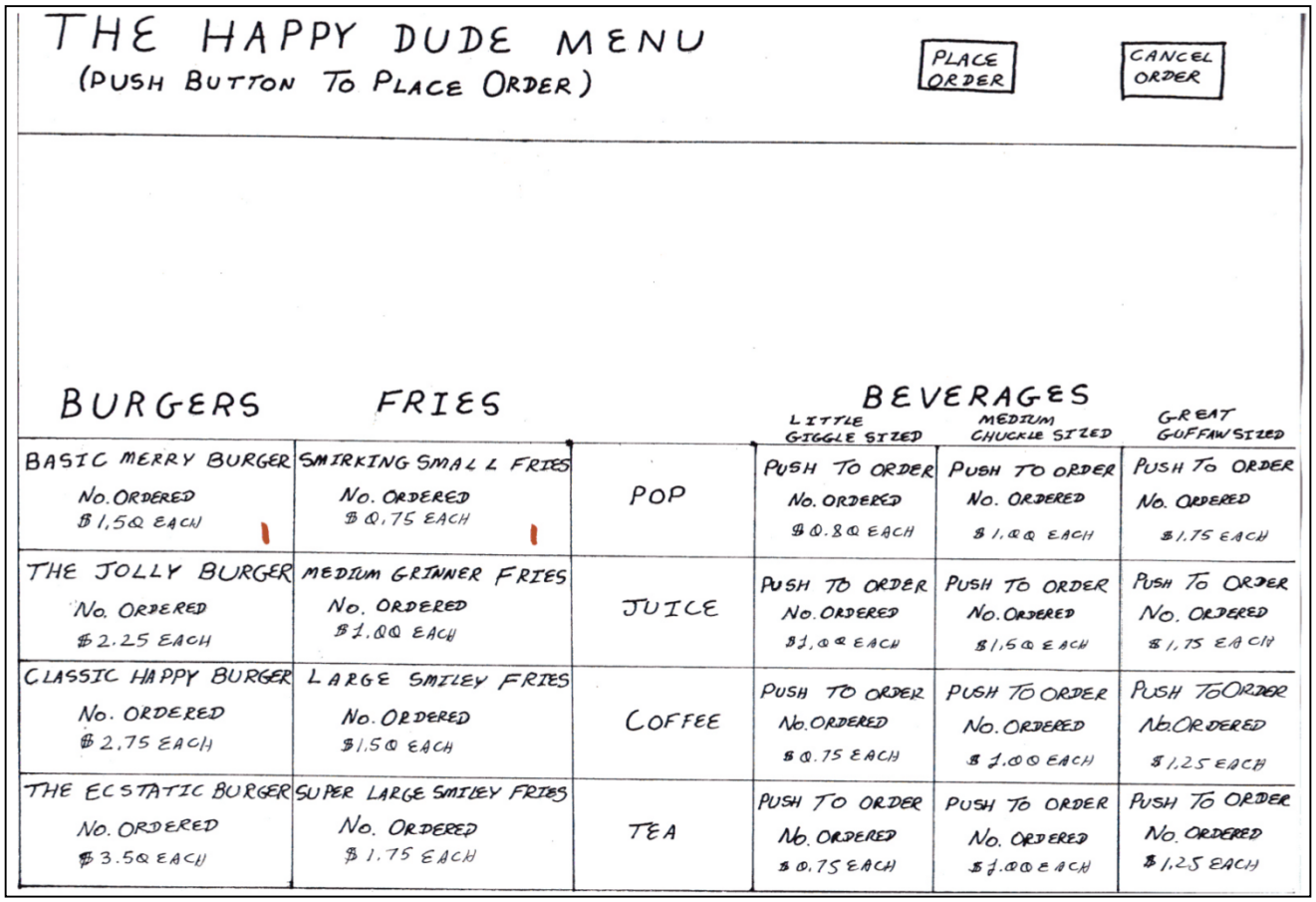
Initial order screen

Storyboarding: Alternate Path (2)



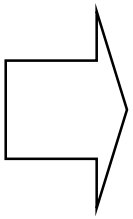
User orders a “Basic Merry Burger”

Storyboarding: Alternate Path (3)



User orders “Smirking small fries”

Storyboarding: Alternate Path (4)



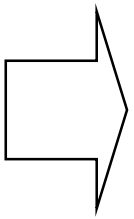
THE HAPPY DUDE MENU

(PUSH BUTTON TO PLACE ORDER)

PLACE ORDER

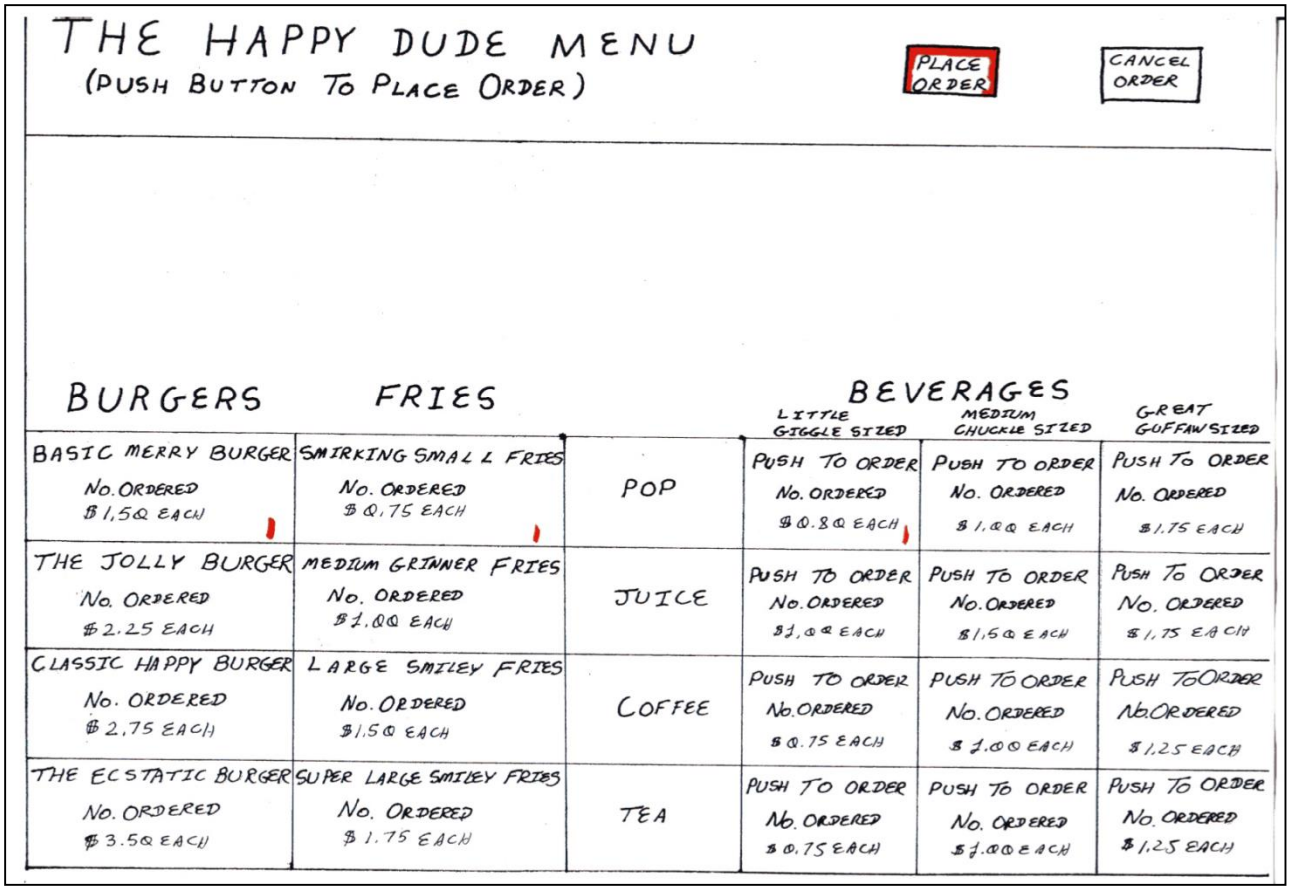
CANCEL ORDER

BURGERS	FRIES		BEVERAGES		
			LITTLE GIGGLE SIZED	MEDIUM CHUCKLE SIZED	GREAT GUFFAW SIZED
BASIC MERRY BURGER No. ORDERED $1.50 EACH	SMIRKING SMALL FRIES No. ORDERED $0.75 EACH	POP	PUSH TO ORDER No. ORDERED $0.80 EACH	PUSH TO ORDER No. ORDERED $1.00 EACH	PUSH TO ORDER No. ORDERED $1.75 EACH
THE JOLLY BURGER No. ORDERED $2.25 EACH	MEDIUM GRINNER FRIES No. ORDERED $1.00 EACH	JUICE	PUSH TO ORDER No. ORDERED $1.00 EACH	PUSH TO ORDER No. ORDERED $1.50 EACH	PUSH TO ORDER No. ORDERED $1.75 EACH
CLASSIC HAPPY BURGER No. ORDERED $2.75 EACH	LARGE SMILEY FRIES No. ORDERED $1.50 EACH	COFFEE	PUSH TO ORDER No. ORDERED $0.75 EACH	PUSH TO ORDER No. ORDERED $1.00 EACH	PUSH TO ORDER No. ORDERED $1.25 EACH
THE ECSTATIC BURGER No. ORDERED $3.50 EACH	SUPER LARGE SMILEY FRIES No. ORDERED $1.75 EACH	TEA	PUSH TO ORDER No. ORDERED $0.75 EACH	PUSH TO ORDER No. ORDERED $1.00 EACH	PUSH TO ORDER No. ORDERED $1.25 EACH



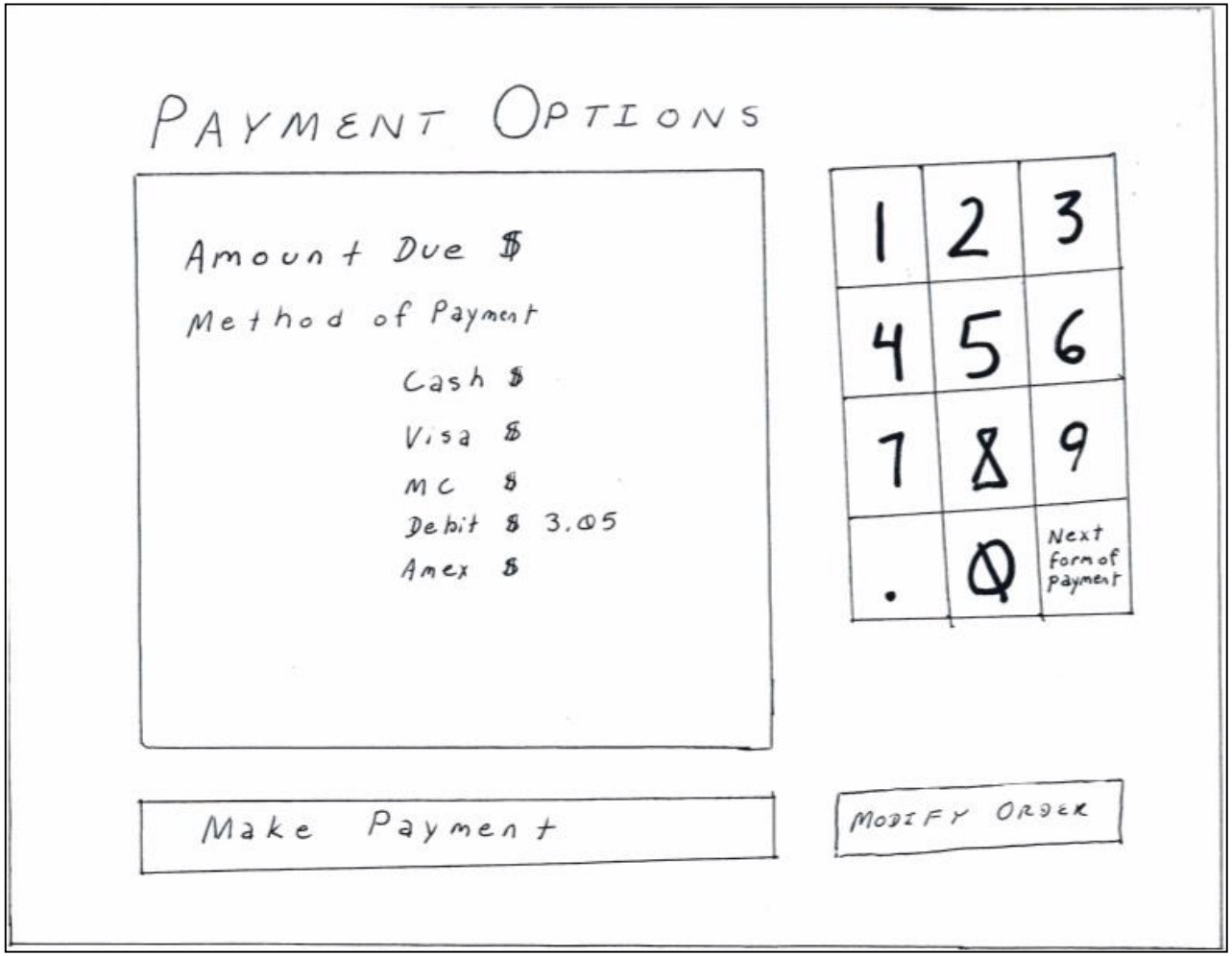
User orders a “Giggle sized pop”

Storyboarding: Alternate Path (5)



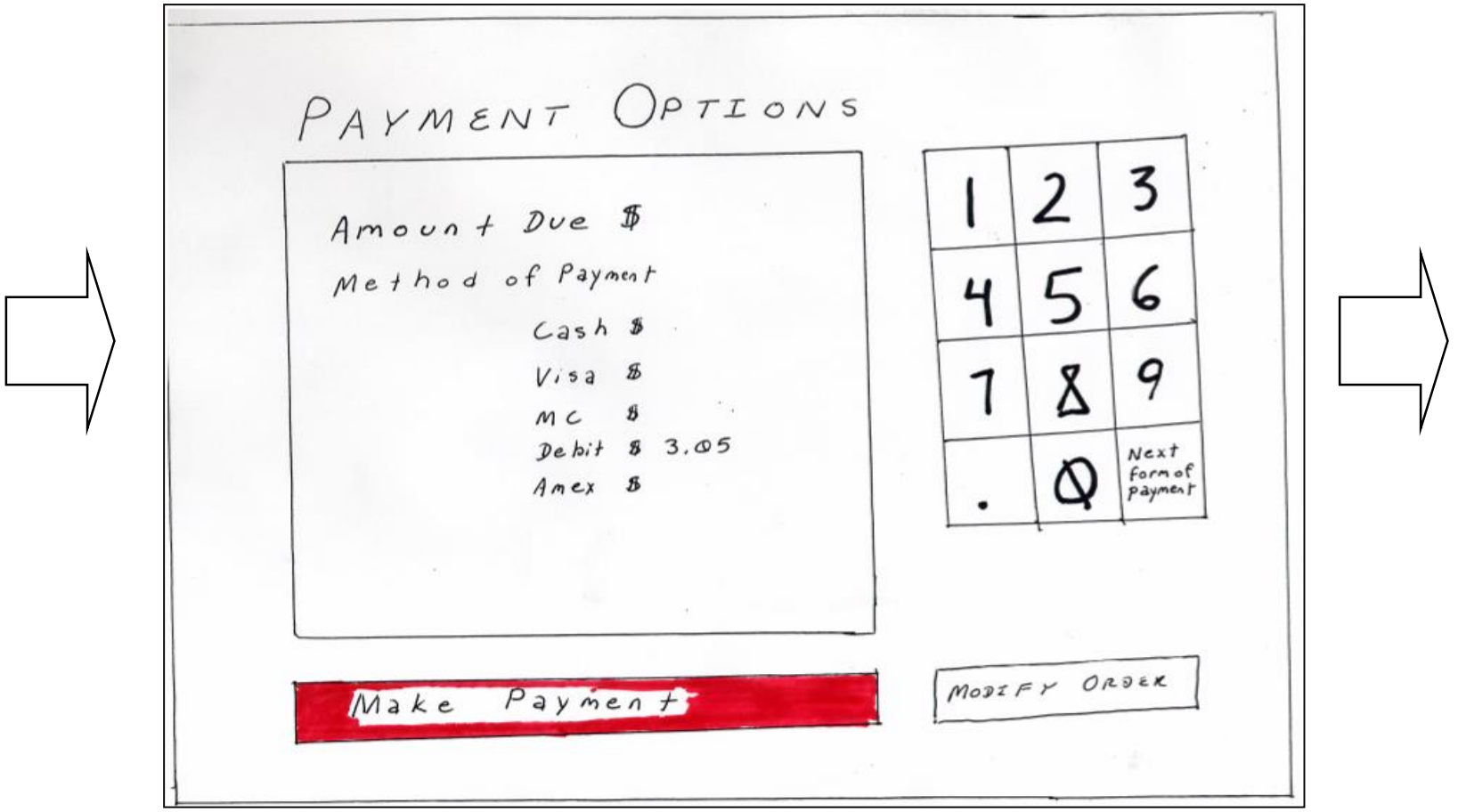
Order is placed

Storyboarding: Alternate Path (6)



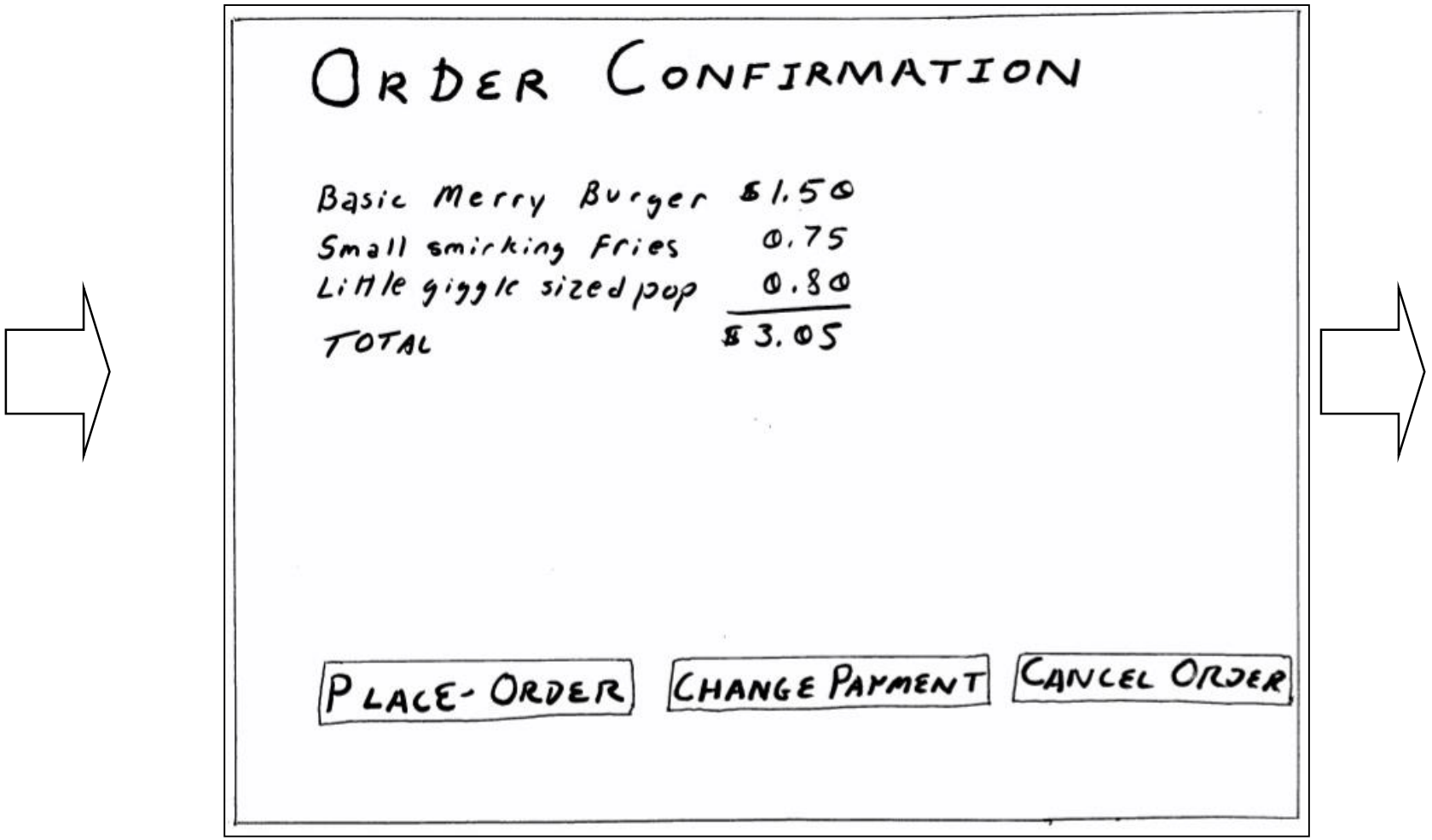
Payment screen comes up

Storyboarding: Alternate Path (7)



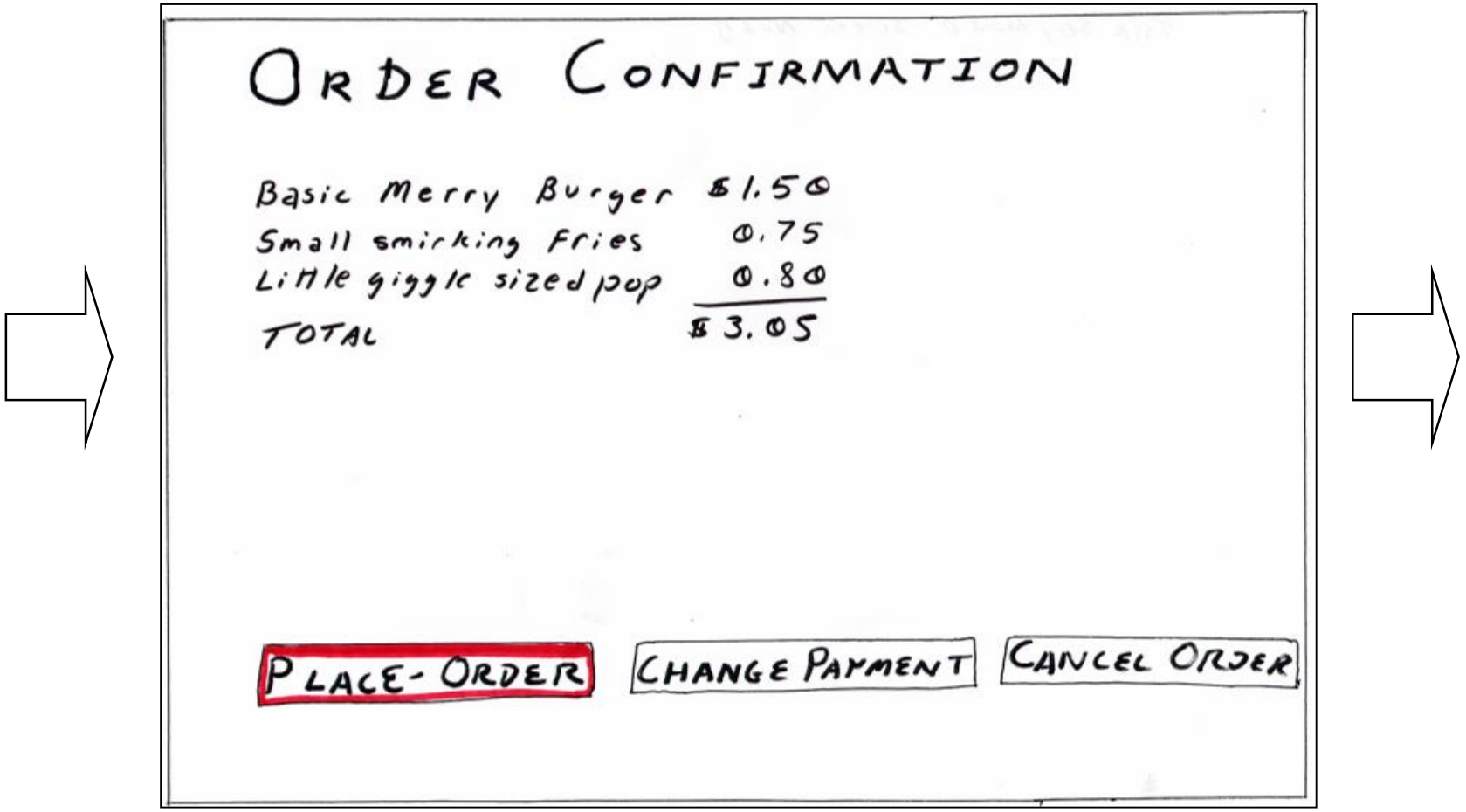
User pays by debit

Storyboarding: Alternate Path (8)



Order confirmation screen comes up

Storyboarding: Alternate Path (9)



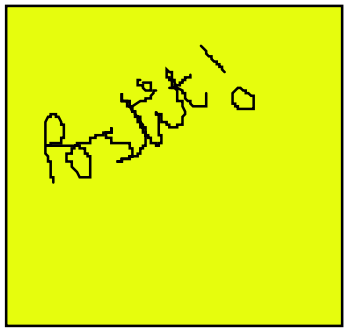
Order is placed

Storyboarding: Alternate Path (10)

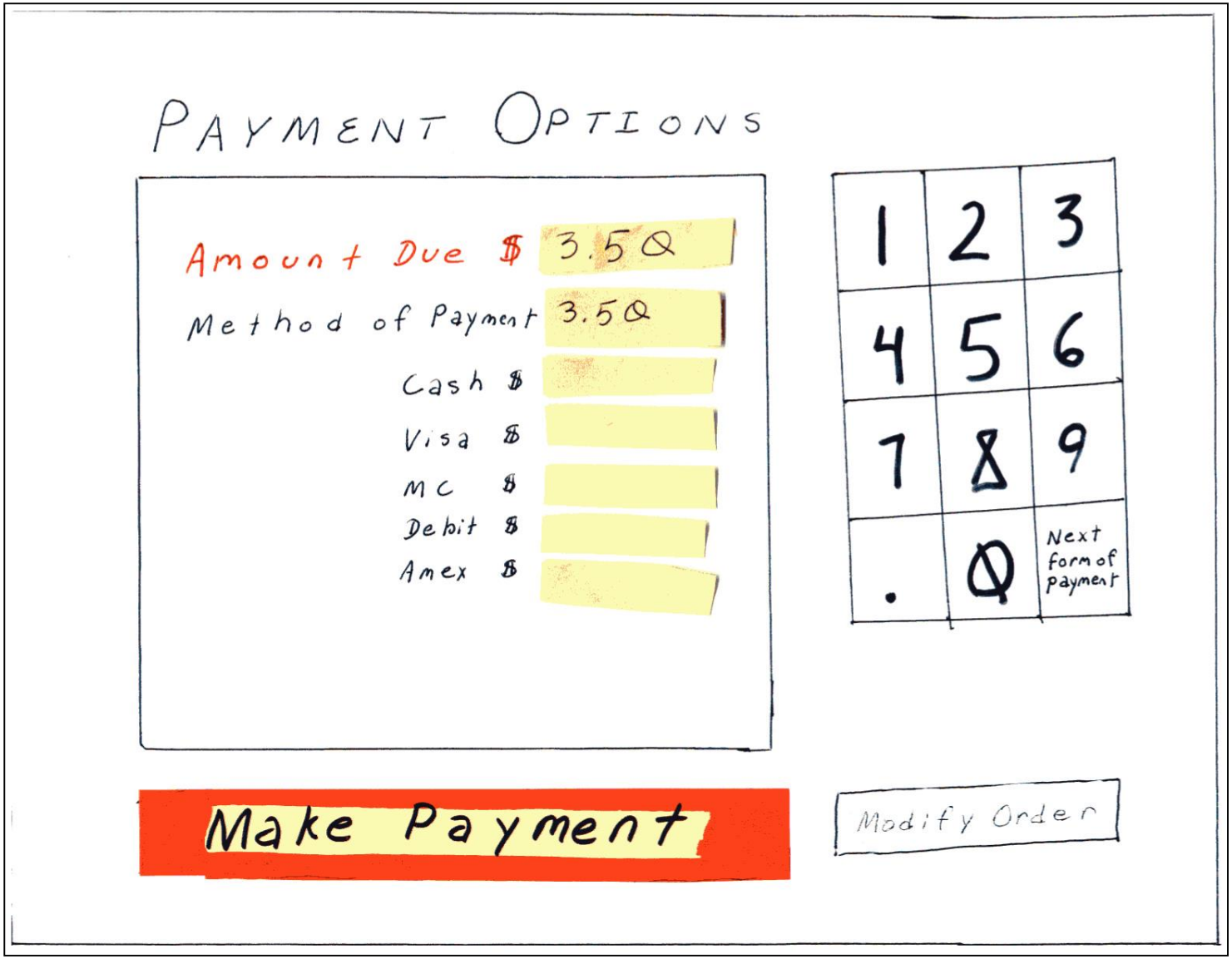
Order confirmation is shown

Low Fidelity Prototypes

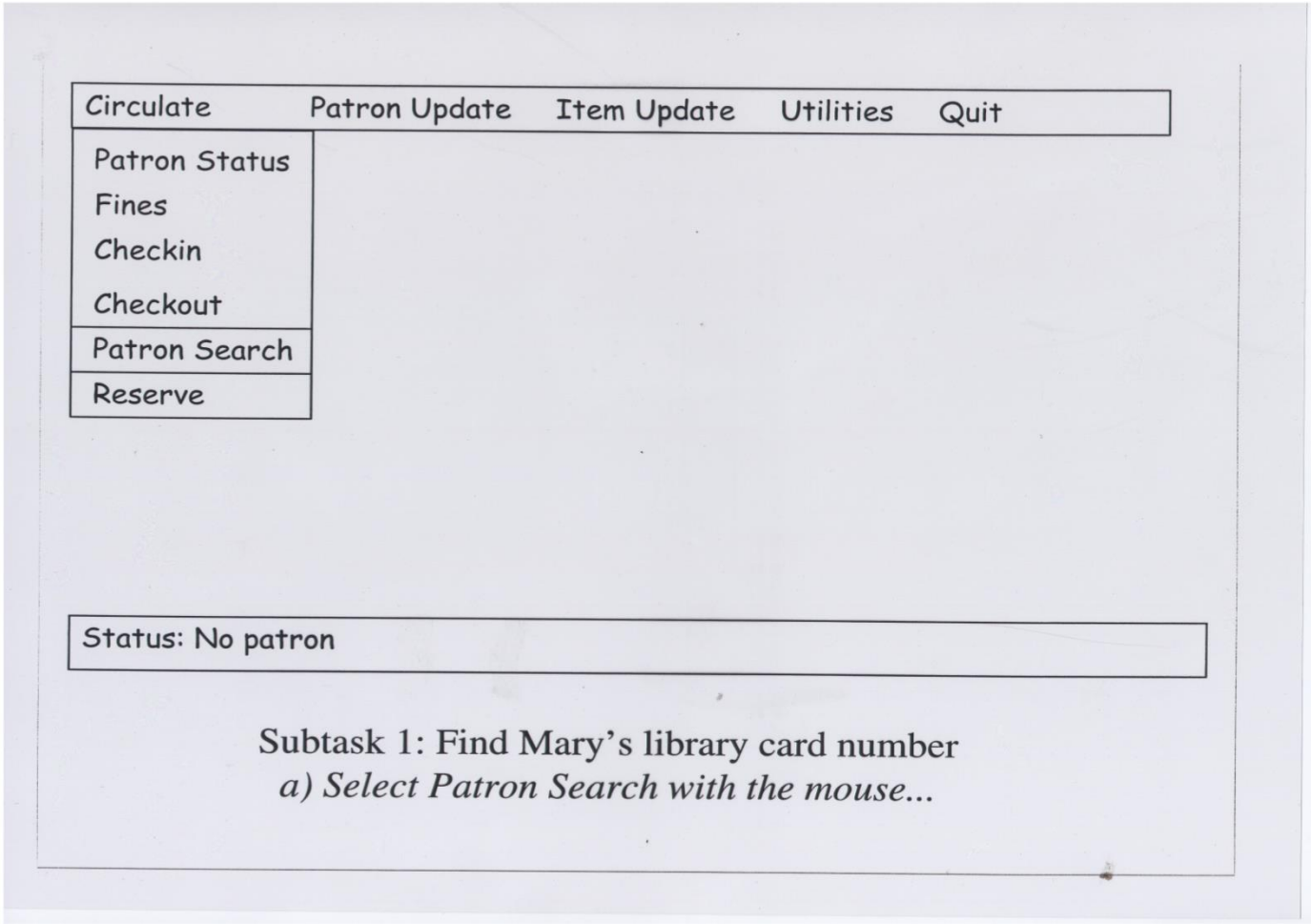
- Pictive
  - "Plastic interface for collaborative technology initiatives through video exploration"
  - Key points:
    - Design consists of multiple layers of sticky notes and plastic overlays
    - Interaction is demonstrated by manipulating notes
  - Session is videotaped for later analysis
    - Usually end up with mess of paper and plastic!
    - "How does it work again?"



Pictive


PAYMENT OPTIONS
Amount Due $ 3.50
Method of Payment 3.50
Cash $
Visa $
MC $
Debit $
Amex $
1 2 3
4 5 6
7 8 9
. 0
Next form of payment
Make Payment
Modify Order

Pictive



Subtask 1: Find Mary's library card number

a) Select Patron Search with the mouse...

Medium Fidelity Prototypes

- Many different types
  - Range from simple computer draw images to partially working systems
- They may take longer to generate and change than simple low fidelity representations
- Benefits
  - It seems more like the completed system so it provides a clearer idea of how it works
  - May be used to elicit feedback from the user when low-fidelity approaches cannot be used
  - Depending upon the type of medium fidelity prototype it may allow for some user testing.
- Pitfalls
  - User's reactions are usually "in the small"
    - Blinds people to major representational flaws
  - Users reluctant to challenge / change the design itself
    - Designs are too "pretty", egos…
  - Management may think its real!

Medium Fidelity Prototypes

- Tutorials and manuals
  - Write them in advance of the system
  - What are they?
    - Tutorial for step by step description of an interaction
      - an interface "walk-through" with directions
    - Manual for reference of key concepts
      - in-depth technical description of the different parts of the system
  - If highly visual, then storyboard is set within textual explanations
  - Does this work?
    - People often read manuals of competing products to check:
      - interface, functionality, match to task
    - Acts as a design tool

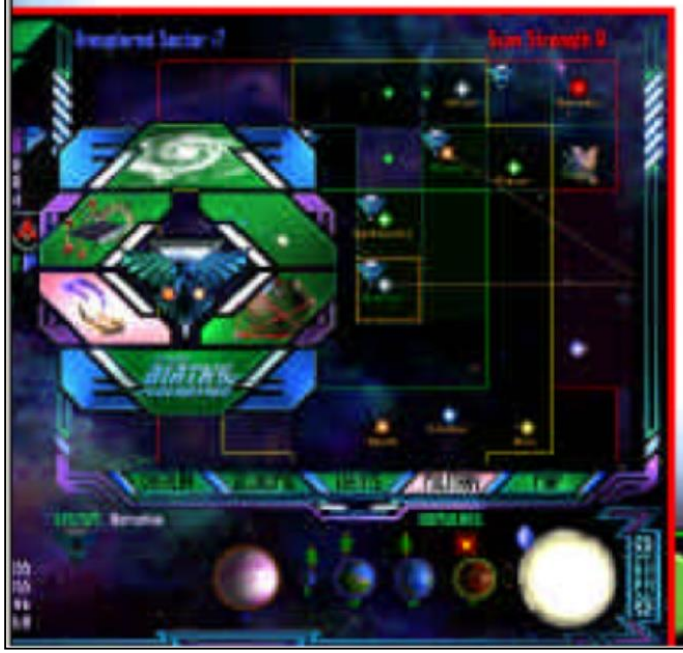
Tutorials

Star Trek: The Birth of the Federation is the property of Atari: http://www.atari.com/

Tutorials

DIPLOMACY

The Pakleds have offered you a Friendship treaty. To read and respond to their proposal, right-click to call up the Marker window. Click the bottom left button to bring up the Diplomacy screen.



Since you just received this proposal, you are automatically in Event mode. This mode is used to view diplomatic messages you have received. The buttons at the left side of the screen are used to change modes: Active lists active treaties involving your empire. Propose is used to propose new treaties, and Race Info is used to view reference material on races you have encountered. For now, stay in Event mode.

The proposed Friendship treaty is of indefinite length and will allow you to establish trade with the Pakleds.

Tutorials

There are three things you can do with this proposal:

1. ***You can accept it by clicking the Accept button.***
2. ***You can reject it by clicking the Reject button.***
3. ***You can ignore it by leaving this screen.***

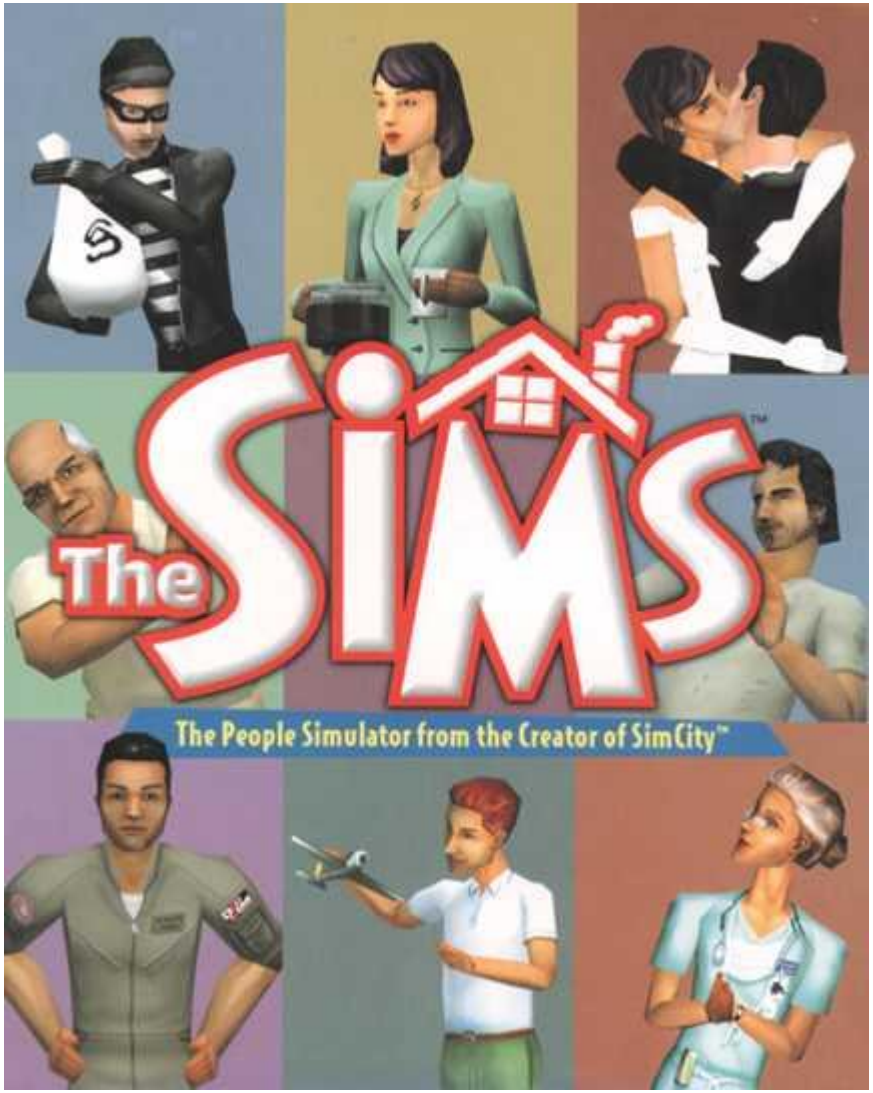
Your decision will be final when you end this turn. Click the Accept button and then right-click to call up the Marker window. Click the top button to return to the Main Galactic screen. Click the Turn button to send your diplomatic response to the Pakleds.

THE SUMMARY WINDOW

Since you accepted the Pakled proposal and clicked the Turn button, the Summary window will appear which tells you what happened during your turn. This window will appear whenever anything happens to a race you have encountered. Click the Summary button in the top left corner of the screen to bring up the Summary window at any time.

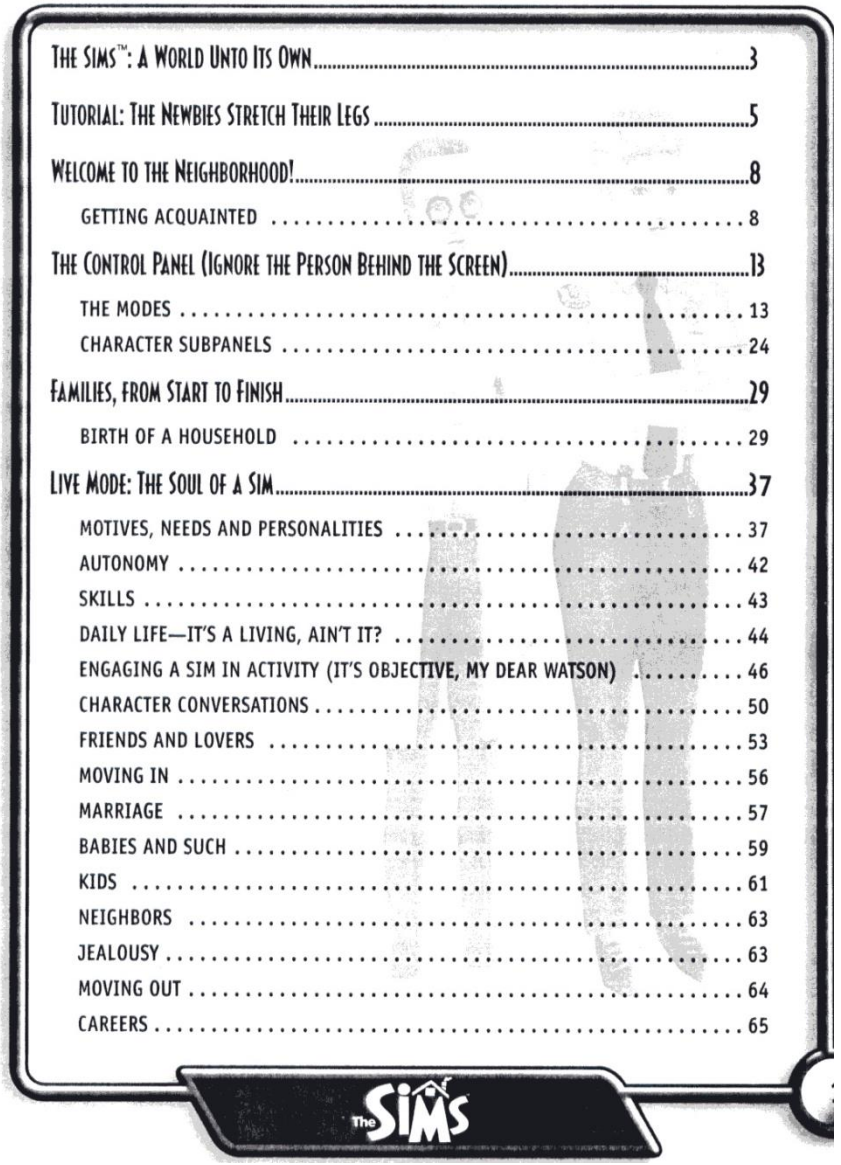
The Summary window has three modes: Events (provides up-to-date information on events), Relationships (shows current treaties) and Systems (shows vital statistics of systems you control). When you're finished, click the Close button to close the Summary window.

Manuals



“The Sims” is the property of Maxis: http://thesims.ea.com/

Manuals



Manuals

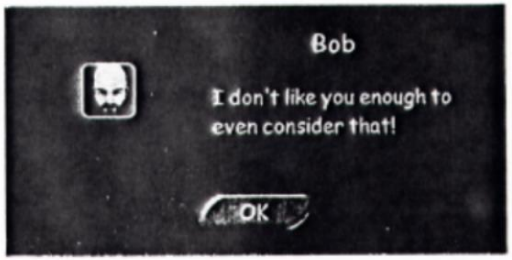
MOVING IN

Getting other folks to move in might seem like an invitation to more lost socks in the laundry, but it really can enhance your household and move your game forward. The Moving In proposition is very similar to the marriage proposal, except that the preconditions are less restrictive, and it's available only for same-sex friends. Opposite-sex friends never have Move In available as a pie menu choice. Characters who move in to another household lose their last name and take on the names of the new household.

Here are the basics for mixing the Neighborhood nuts—we mean Sims—together. First of all, and pretty obviously, a neighbor has to be in a Sim's house for it all to happen. Both Sims must be the same sex, and they've both got to be in pretty good moods. Once that's cooking, the household Sim finds "Move In" is a pie menu choice when the visiting Sim is clicked on. So if you've got a situation where a couple of opposite-sex Sims are living together and you're looking for a neighbor to move in, you need to have the Sim that's th same sex as the neighbor be the one that extends the invitation.

The plot thickens: If the two Sims' relationship is good enough, the visitor accepts. Bingo instant housemate! If the conditions aren't ripe, the visitor declines, and so do both parties' Relationship points. The person moving in doesn't require a specific amount of household Simoleons, so watch out for moochers.

If the Sim refuses the invitation, they tell you why: "Your place isn't big enough," or "We don't know each other well enough," or "I'm in a bad mood today."



Medium Fidelity Prototypes

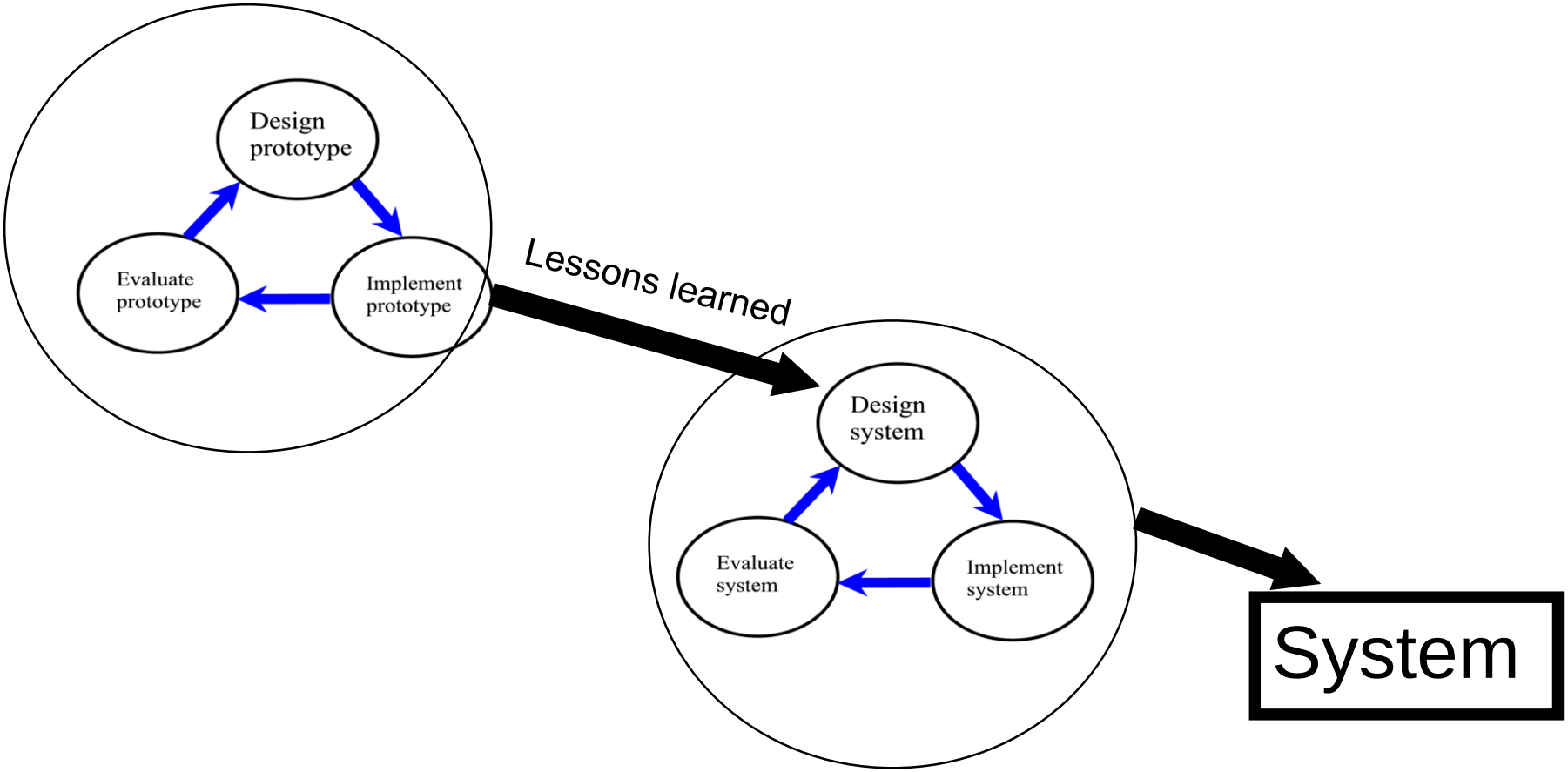
- Approaches to limiting prototype functionality
  - Vertical prototypes
    - Includes in-depth functionality for only a few selected features
    - Common design ideas can be tested in depth
  - Horizontal prototypes
    - Surface layers includes the entire user interface with no underlying functionality
    - A simulation; no real work can be performed
  - Scenario
    - Scripts of particular fixed uses of the system; no deviation allowed

Medium Fidelity Prototypes

- Approaches to integrating prototypes and the final product:
  - Throw-away
  - Incremental
  - Evolutionary

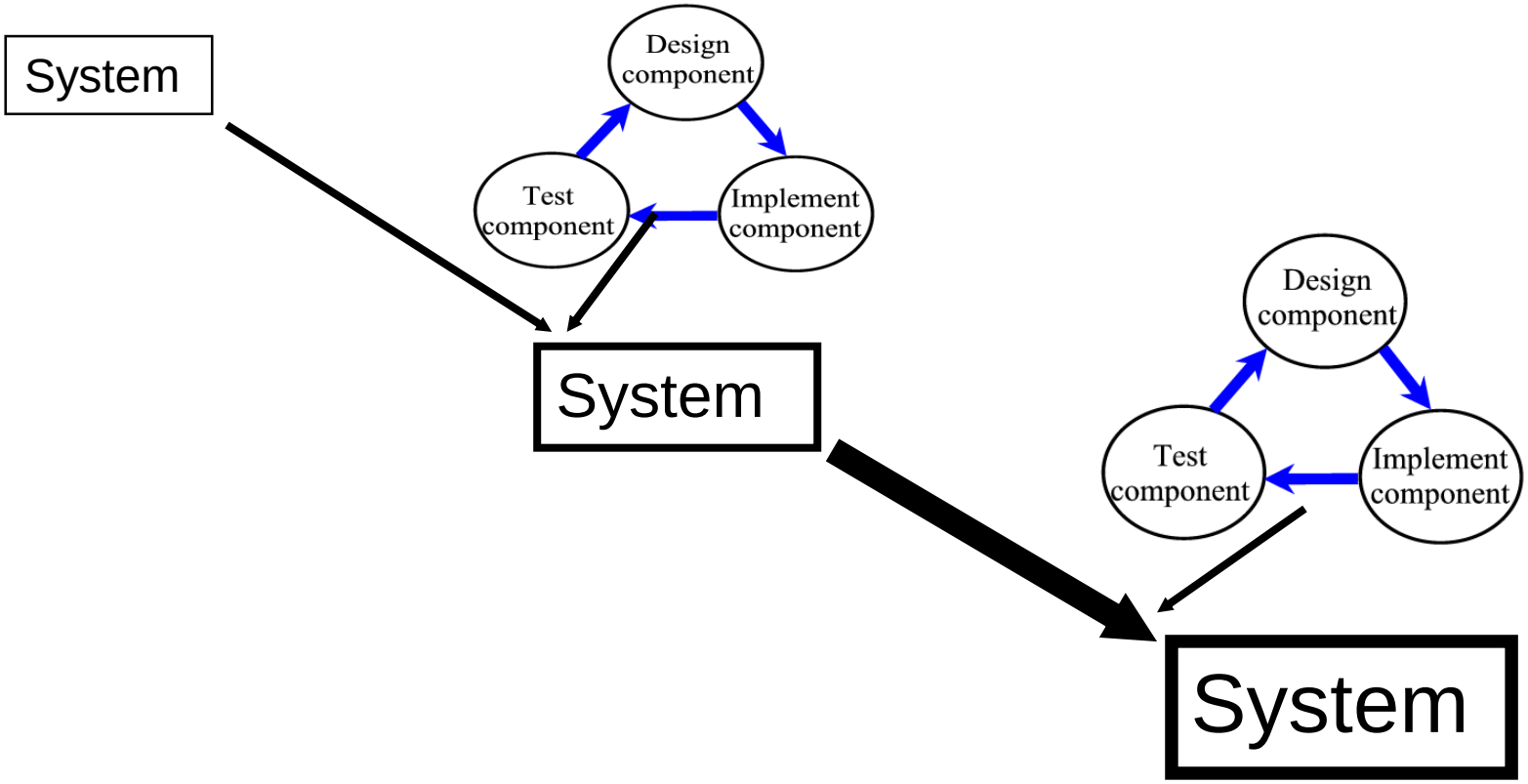
Throw-Away Approach To Prototyping

- The prototype only is used to get feedback
- The prototype is built, tested and then discarded



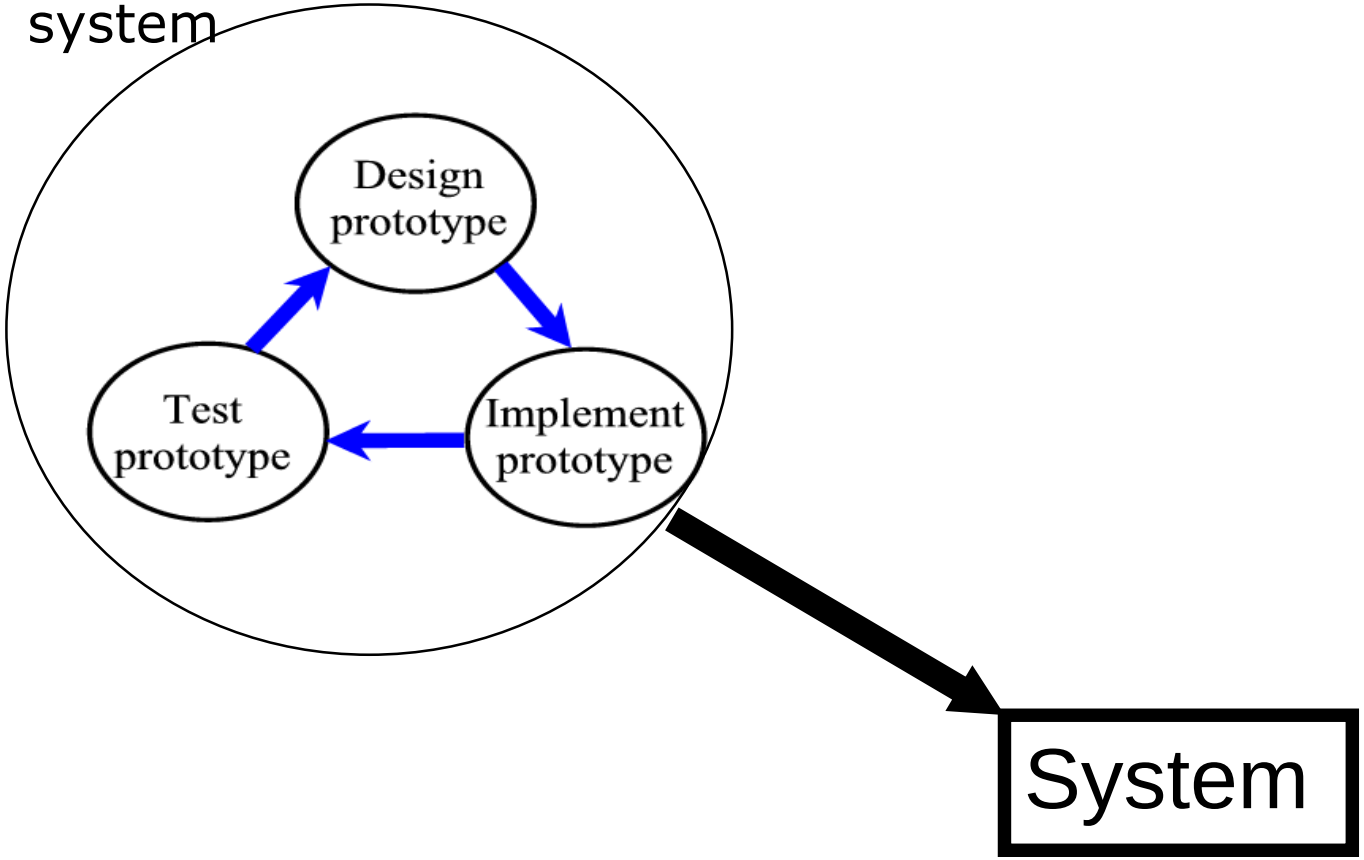
Incremental Approach To Prototyping

- Build the system as separate modules (component)
- Each module is designed, prototyped and completed separately before being added to the final system



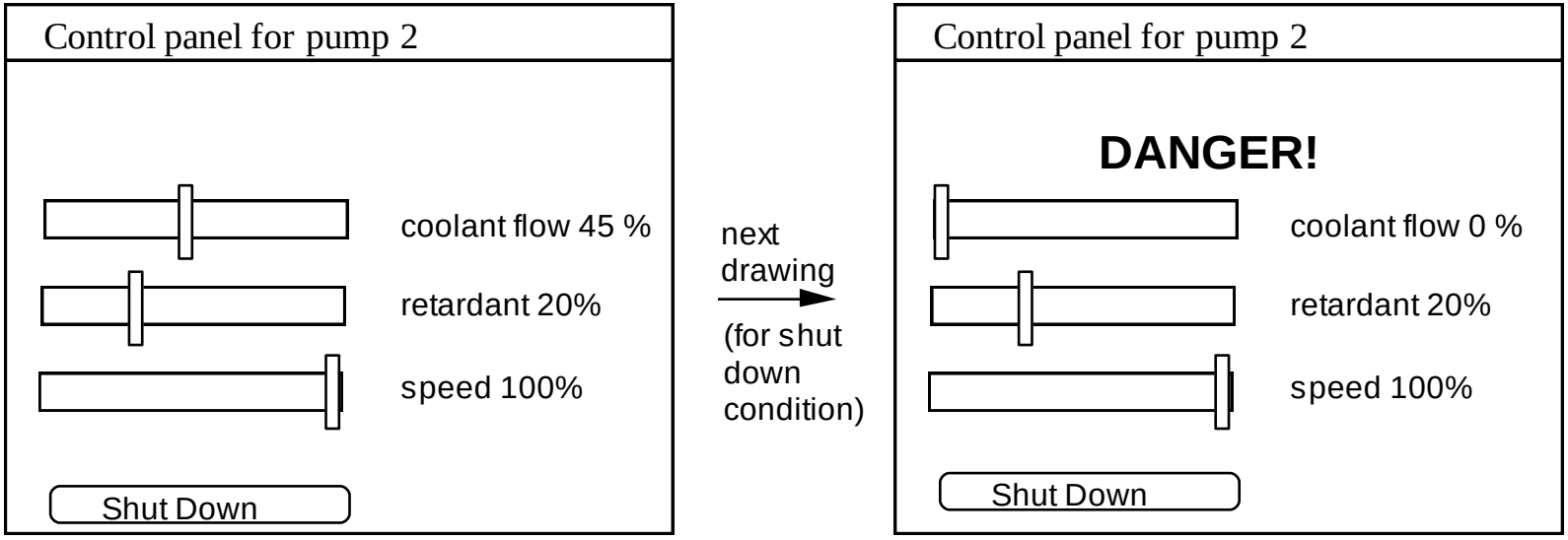
Evolutionary Approach To Prototyping

- Change the prototype itself in order to incorporate changes
- Eventually the reworked prototype becomes the final system



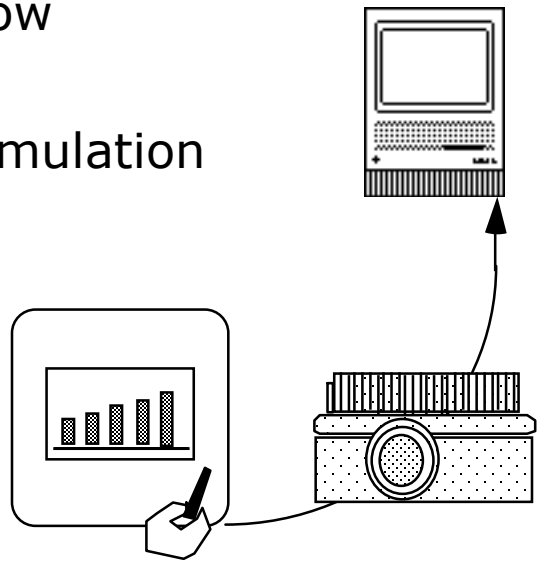
Medium Fidelity Prototypes

- Painting/drawing packages
  - Draw each storyboard scene on computer
    - Neater/easier (?) to change on the fly than paper



Medium Fidelity Prototypes

- Scripted simulations and slide shows
  - Encode the storyboard on the computer
    - Created with media tools
    - Scene transition activated by simple user inputs
    - A simple horizontal and vertical prototype
  - User given a very tight script/task to follow
    - Appears to behave as a real system
    - Deviations from the script blows the simulation



Scripted Simulations

What to do

Find the item you want in the catalog and scan the bar code next to it.

What you selected

Item | Style | Cost

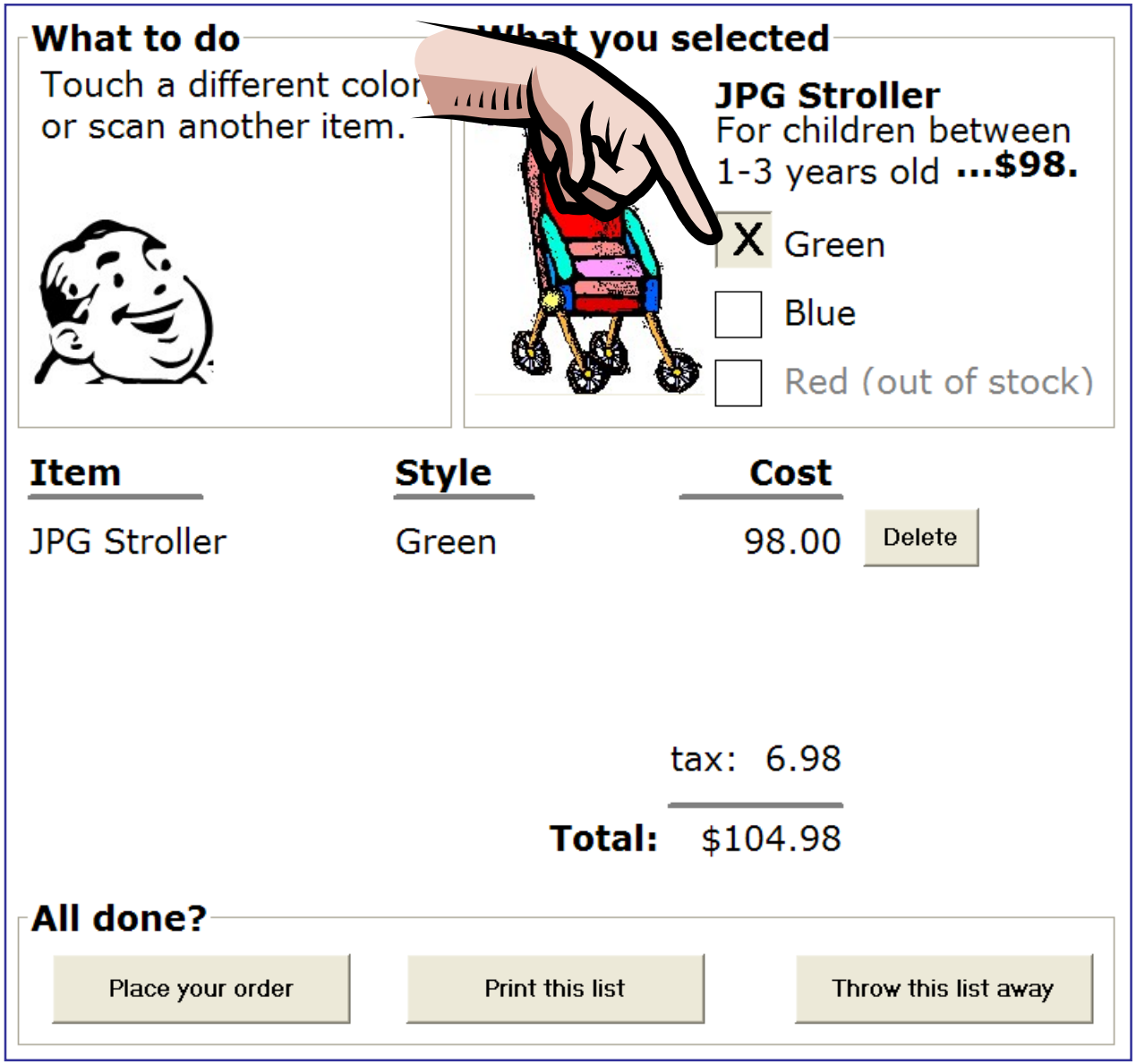
tax:

Total: $ 0.00

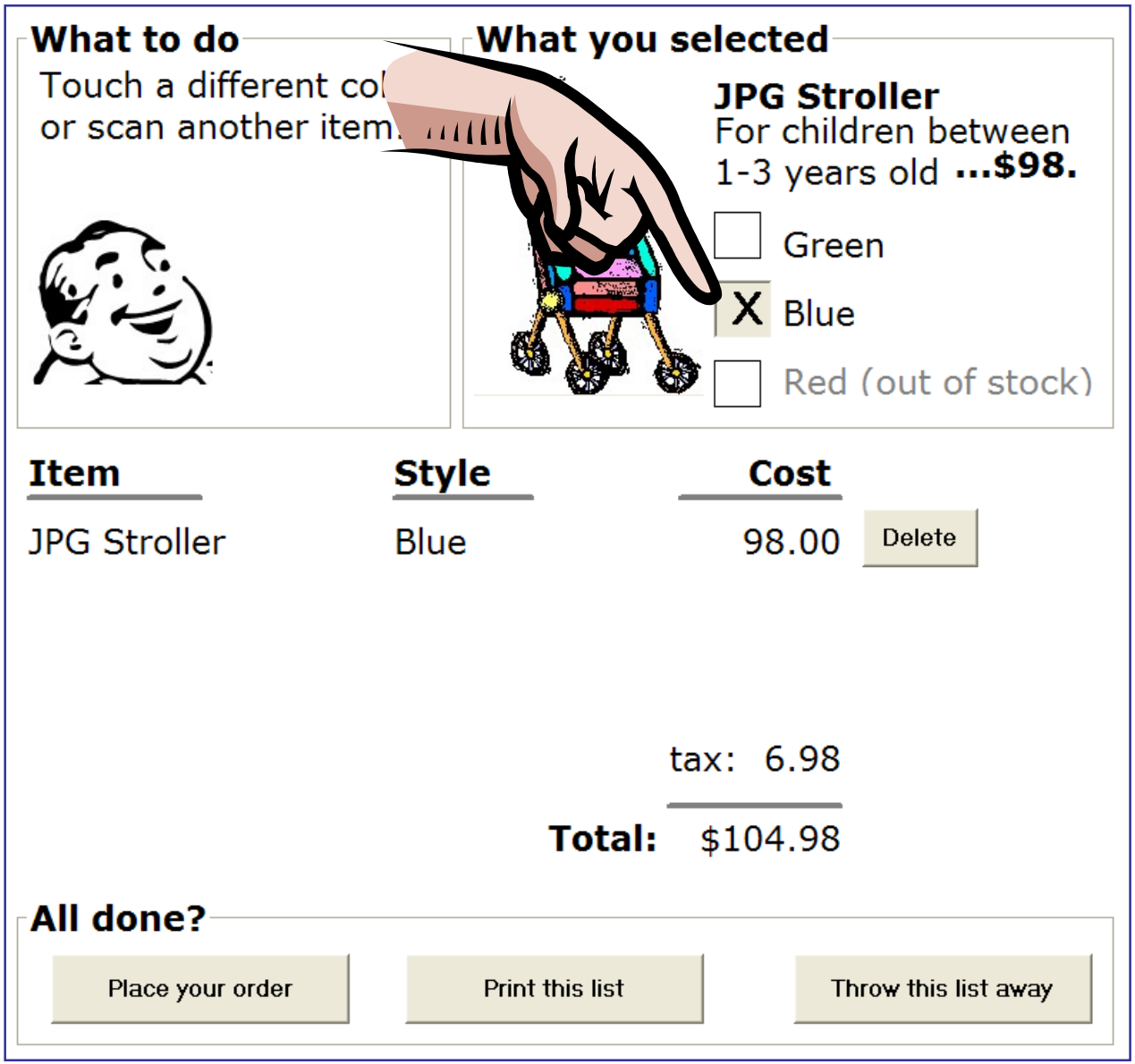
All done?

Place your order | Print this list | Throw this list away

Scripted Simulations



Scripted Simulations

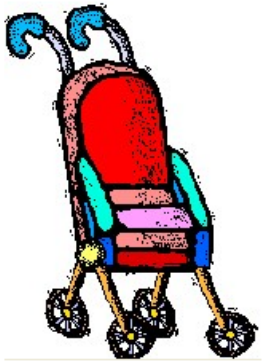


Scripted Simulations

What to do

Touch a different color, or scan another item.

What you selected



JPG Stroller
For children between 1-3 years old **...$98.**

- ☐ Green
- ☒ Blue
- ☐ Red (out of stock)

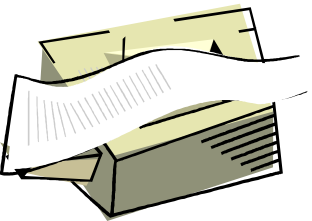
Item	Style	Cost	
JPG Stroller	Blue	98.00	Delete

tax: 6.98

Total: $104.98

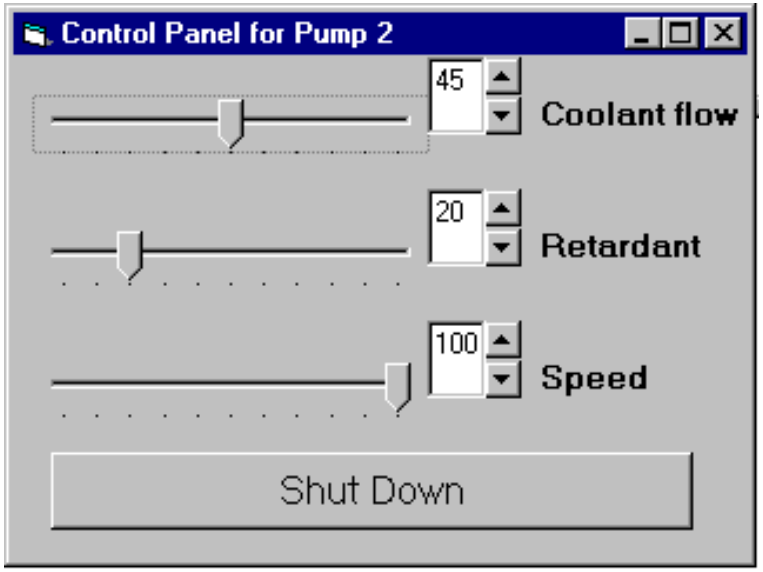
one?

Place your order | Print this list | Throw this list away



Medium Fidelity Prototypes

- Interface builders
  - Tools for letting a designer lay out the common widgets
  - Construct mode
    - Change attributes of objects
  - Test mode:
    - Objects behave as they would under real situations
  - Excellent for showing look and feel
    - A broader horizontal prototype
    - But constrained to widget library
  - Vertical functionality added selectively
    - Through programming

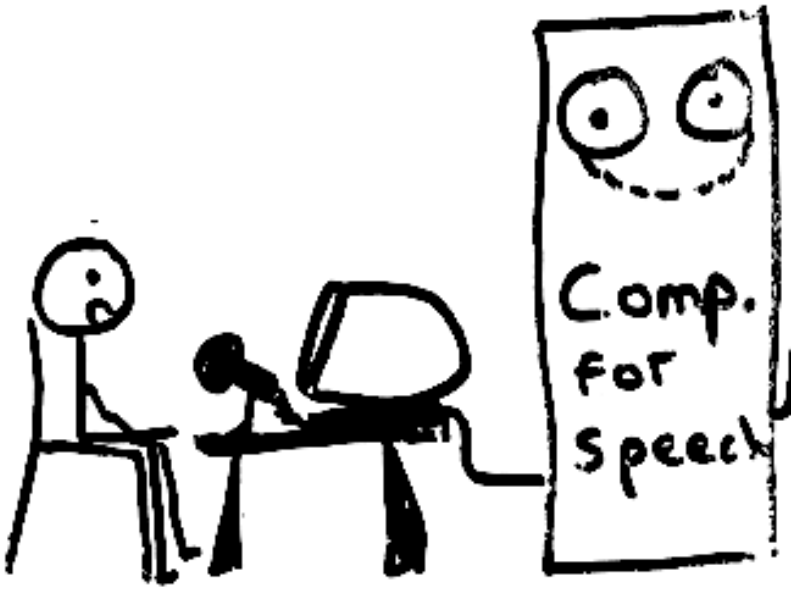


The Wizard Of OZ: The Movie

The Wizard Of OZ: The Movie

Wizard Of Oz: The Prototyping Technique

- A method of testing a system that does not exist
  - Human simulates the system's intelligence and interacts with user
  - e.g., the voice editor, by IBM (1984)



What the user sees

The Wizard

Wizard Of Oz: Examples

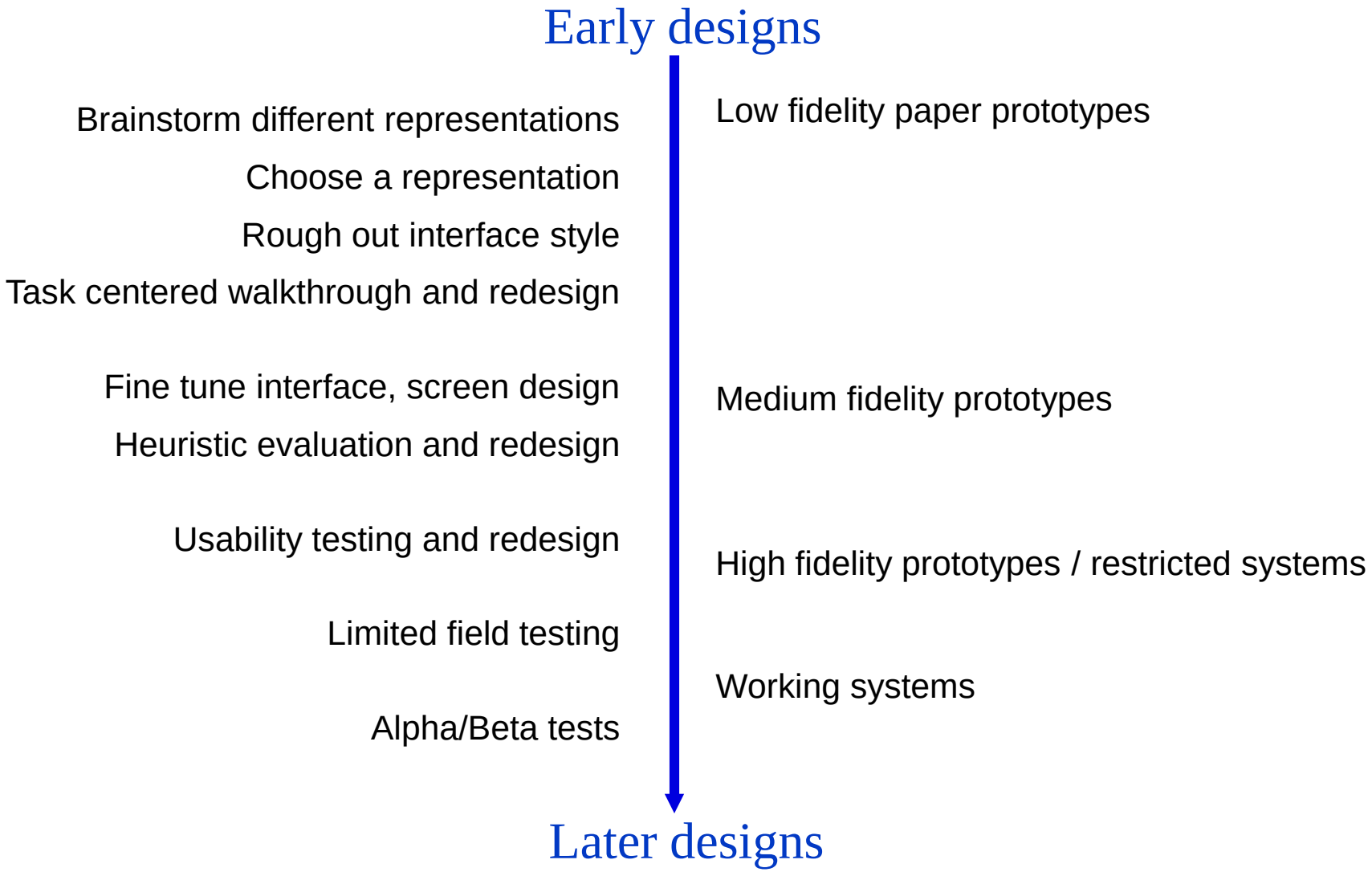
- IBM: an imperfect listening typewriter using continuous speech recognition
  - Secretary trained to:
    - Understand key words as "commands"
    - Types responses on screen as the system would
    - Manipulating graphic images through gesture and speech

- Intelligent Agents / Programming by demonstration
  - Person trained to mimic "learning agent"
    - User provides examples of task they are trying to do
    - Computer learns from them
  - Shows how people specify their tasks

High-fidelity prototyping

- Uses materials that you would expect to be in the final product.
- Prototype looks more like the final system than a low-fidelity version.
- For a high-fidelity software prototype common environments include Macromedia Director, Visual Basic, and Smalltalk.
- Danger that users think they have a full system

The Prototyping Process



Compromises in prototyping

- All prototypes involve compromises
- For software-based prototyping maybe there is a slow response? sketchy icons? limited functionality?
- Two common types of compromise
    - ‘horizontal’: provide a wide range of functions, but with little detail
    - ‘vertical’: provide a lot of detail for only a few functions
- Compromises in prototypes mustn’t be ignored. Product needs engineering

Conceptual design: from requirements to design

- Transform user requirements/needs into a conceptual model
- "a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave and look like, that will be understandable by the users in the manner intended"
- Don't move to a solution too quickly. Iterate, iterate, iterate
- Consider alternatives: prototyping helps

Three perspectives for a conceptual model

- Which interaction mode?
  - How the user invokes actions
  - Activity-based: instructing, conversing, manipulating and navigating, exploring and browsing.
  - Object-based: structured around real-world objects

Three perspectives for a conceptual model

- Which interaction paradigm?
  - desktop paradigm, with WIMP interface (windows, icons, menus and pointers),
  - ubiquitous computing
  - pervasive computing
  - wearable computing
  - mobile devices and so on.

- Is there a suitable metaphor?
  - (contd)….

Expanding the conceptual model

- What functions will the product perform?
  - What will the product do and what will the human do (task allocation)?
- How are the functions related to each other?
  - sequential or parallel?
  - categorisations, e.g. all actions related to telephone memory storage
- What information needs to be available?
  - What data is required to perform the task?
  - How is this data to be transformed by the system?

Using scenarios in conceptual design

- Express proposed or imagined situations
- Used throughout design in various ways
  - scripts for user evaluation of prototypes
  - concrete examples of tasks
  - as a means of co-operation across professional boundaries
- Plus and minus scenarios to explore extreme cases

Using prototypes in conceptual design

- Allow evaluation of emerging ideas
- Low-fidelity prototypes used early on, high-fidelity prototypes used later

Screen design

Two aspects:

- How to split across screens

  moving around within and between screens

  how much interaction per screen?

  serial or workbench style?

- Individual screen design

  white space: balance between enough information/interaction and clarity

  grouping items together: separation with boxes? lines? colors?

Screen design: splitting functions across screens

- Task analysis as a starting point
- Each screen contains a single simple step?
- Frustration if too many simple screens
- Keep information available: multiple screens open at once

Screen design: individual screen design

- Draw user attention to salient point, e.g. colour, motion, boxing
- Animation is very powerful but can be distracting
- Good organization helps: grouping, physical proximity
- Trade off between sparse population and overcrowding

Information display

- Relevant information available at all times
- Different types of information imply different kinds of display
- Consistency between paper display and screen data entry

Summary

- Different kinds of prototyping are used for different purposes and at different stages
- Prototypes answer questions, so prototype appropriately
- Construction: the final product must be engineered appropriately
- Conceptual design (the first step of design)
- Physical design: e.g. menus, icons, screen design, information display
- Prototypes and scenarios are used throughout design